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Record of Decision

SUPPLEMENT TO THE 1992 FINAL ENVIRONMENTAL IMPACT STATEMENT

TRANSCOLORADO GAS TRANSMISSION PROJECT

Colorado/New Mexico

U.S. Department of the Interior
Bureau of Land Management
Montrose District Office
Craig District Office
Farmington District Office

U.S. Department of Agriculture
U.S. Forest Service
San Juan, Grand Mesa, Uncompahgre and
Gunnison National Forests

June 1998

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UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
MONTROSE DISTRICT OFFICE
2465 South Townsend
Montrose, CO 81401

IN REPLY REFER TO:
2800 (CO-030)
COC-51280

Dear Reader:

The Bureau of Land Management (BLM), as lead agency, and in cooperation with the U. S. Forest Service (USFS) has prepared a Record of Decision (ROD) for the Final Supplement (Supplement) to the 1992 Final Environmental Impact Statement (FEIS) for the TransColorado Gas Transmission (TransColorado) Project on federal lands in Colorado and New Mexico. TransColorado Gas Transmission Company is the proponent. Lands managed by the BLM in the Montrose, Craig, and Grand Junction Districts in Colorado, and the Farmington District in New Mexico, and the USFS in the Uncompahgre and San Juan National Forests, Colorado, are crossed by the TransColorado pipeline project. The ROD for the Supplement adopts the Agency Preferred Alternative contained in the Supplement *along with additional mitigating measures*.

The ROD approves the authorization of construction, operation, maintenance, and termination of route changes and realignments (less than 100 ft.) of the approved pipeline and right-of-way (ROW) grant COC-51280, and the authorization of additional temporary work areas adjacent to the approved ROW or ROW route changes or minor realignments. The ROD also approves the authorization of realignments and use of relocated temporary work areas, in unspecified locations to accommodate conditions that might be encountered during construction. Also approved in the ROD are modifications to several environmental protection measures contained in the 1992 ROW grant. The ROD also requires several additional mitigation measures to be attached to authorizations for the project that are based on environmental concerns expressed but which were not fully incorporated into the Supplement.

Additional copies of the ROD can be obtained by calling Bill Bottomly BLM (970)240-5337 in Montrose, Ilyse Auringer, BLM (970)385-1341 in Durango, Dave Lehmann, BLM (970)244-3021 in Grand Junction, or Steve Hemphill, USFS (970)874-6633 in Delta.

We would like to express our appreciation to the many organizations and individuals who contributed to the preparation of the Supplement to the 1992 TransColorado FEIS, and to this decision. We thank you for assisting in the management of your federal lands.

Sincerely,

Mark W. Stiles,
District Manager, Montrose District

RECORD OF DECISION

for

THE FINAL SUPPLEMENT TO THE 1992 FINAL ENVIRONMENTAL IMPACT STATEMENT

TRANSCOLORADO GAS TRANSMISSION COMPANY

NATURAL GAS PIPELINE - COLORADO/NEW MEXICO

PURPOSE AND NEED

On January 25, 1990, TransColorado Gas Transmission Company (TransColorado) filed an application with the Bureau of Land Management (BLM) for a right-of-way (ROW) grant under Section 28 of the Mineral Leasing Act (MLA) of 1920, as amended (30 U.S.C. 185). This application was for the construction, operation, maintenance and termination of one 22" to 24" natural gas pipeline, associated parallel temporary use area, appurtenances, and ancillary facilities across 104 miles of BLM and 65 miles of Forest Service (USFS) lands between the Piceance Basin near Meeker, Colorado to an interconnection near Bloomfield, New Mexico. This MLA ROW application was assigned to the BLM as the lead agency. The proposed gas transmission pipeline project is referred to as the TransColorado Project.

The pipeline route, parallel temporary use area (TUA), and associated facilities were evaluated in the Final Environmental Impact Statement, TransColorado Gas Transmission Project (FEIS), completed in 1992 by the BLM. Cooperating in the preparation of the FEIS were the USFS, the Federal Energy Regulatory Commission (FERC), the U. S. Fish and Wildlife Service (USFWS), the U. S. Corps of Engineers (COE) and the National Park Service (NPS). In a December, 1992 Record of Decision (ROD), the BLM approved the granting of a 50 foot-wide MLA ROW and a 25 foot-wide, parallel Temporary Use Permit (TUP) to TransColorado for the construction of the project, subject to certain terms and conditions. The USFS issued a separate ROD that amended the Uncompahgre and the San Juan National Forests' Land and Resource Management Plans, establishing a utility corridor across both National Forests. Concurrently with the 1992 ROD and under the authority of Section 28 of the MLA of 1920, as amended (30 U.S.C. 185), BLM issued a ROW grant and TUP (COC-51280) to TransColorado.

The TransColorado 1992 FEIS states that "the purpose of the proposed TransColorado Gas Transmission Project is to provide a regional natural gas transmission system to transport natural gas from the Western Slope of Colorado and the Rocky Mountain region to major interconnections with other interstate pipelines for ultimate delivery to Southwest, Midwest, and California markets". This stated purpose has not changed. The BLM and the USFS have reviewed the 1992 FEIS and RODs, and have concluded that these documents remain appropriate and adequate. The agencies have concluded that the correct process to analyze minor project changes and new information identified for this project since 1992 is through a supplement to the 1992 FEIS.

The decisions herein are based on the analyses contained in the Final Supplement to the 1992 FEIS (Supplement) dated April 24, 1998, for the TransColorado Gas Transmission Project. These decisions are intended to augment the 1992 FEIS and RODs and are limited in scope, focused on new information and issues identified since the 1992 FEIS and ROD. Pursuant to 40 CFR 1506.3, the BLM and the USFS have independently reviewed the Supplement in conjunction with the 1992 FEIS and have concluded that with the mitigation measures documented in the 1992 FEIS and those identified in the Agency Preferred Alternative of the Supplement to the 1992 FEIS, the BLM and USFS comments and suggestions have been satisfactorily integrated. Uncompahgre National Forest and the San Juan National Forest letters of concurrence with the Supplement and with this ROD are on file at the Montrose District Office of the BLM.

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Under the MLA, the Department of the Interior, Bureau of Land Management has been delegated the discretionary authority to issue a ROW and TUPs, or amended ROWs, for all lands administered by two or more Federal agencies involved in a natural gas pipeline project and related facilities. Implementing regulations are contained in 43 CFR 2800 and 2880, and policy guidance contained in BLM Manual 2800. The Montrose District Manager, Bureau of Land Management, has been designated as the BLM Authorized Officer for this Project. Following these regulations and with the concurrence of the USFS, the BLM will offer and if accepted, grant amendment(s) to TransColorado's existing ROW grant for the TransColorado pipeline, related facilities and actions on BLM and USFS Federal lands. The offered amended MLA ROW grant will contain the decisions herein adopted from the Agency Preferred Alternative of the Supplement for:

1. Route changes and realignments,

2. Temporary use areas,

3. Route realignments and temporary use area relocations at unspecified areas,

4. Revisions to several environmental protection measures approved in the 1992 RODs, and

5. Re-authorization of the 25 foot-wide Temporary Use Area (TUA) parallel to the ROW.

Further, the amended MLA ROW grant offered to TransColorado will contain stipulations concerning hazardous materials, threatened and endangered species, BLM and USFS sensitive species, Department of Transportation health and safety issues, any future modifications to mitigation measures, valid existing rights, Plan of Development, strict liability, steep slopes special mitigation and visual resource mitigation.

DECISION

As the Authorized Officer for the Federal land managing agencies, I approve the following amendments to the TransColorado Gas Transmission Company ROW grant COC-51280 on Federal lands managed by the BLM and USFS:

1. Route Changes and Realignments

Offer to TransColorado, and grant if accepted, an amended MLA ROW grant COC-51280 for the Federal lands involved, incorporating pipeline route changes greater than 100 feet from the existing centerline of the pipeline, and pipeline realignments that are less than 100 feet from the existing centerline of the pipeline. The permanent width of the amended ROW will be 50 feet. The term of the amended ROW grant will be for 30 years from the date of the original ROW grant, COC-51280. The route changes and realignments herein are described in Chapter 2, Tables 2-1, 2-2, and 2-3, of the Agency Preferred Alternative of the Supplement. Maps of each route change are shown in Appendix B of the Supplement. Legal descriptions for these route changes and realignments on Federal lands affected by this decision are shown in Attachment 1 of this ROD. The route of the entire ROW, including these route changes and realignments, and ancillary facilities, is shown on the official Approved ROW Alignment Sheets for the pipeline and related facilities designated as; "TransColorado Pipeline Project Construction Alignment Sheets." The offered amended ROW grant will be subject to the terms and conditions as specified in this ROD, as well as all of the terms and conditions specified in the 1992 ROD from the FEIS (except as modified herein).

2. Temporary Use Areas

Offer to TransColorado and grant if accepted Temporary Use Permits (TUPs) for temporary use areas (TUAs) on the Federal lands for the purpose of constructing one 22 to 24 inch natural gas pipeline associated with ROW COC-51280 and amended ROW COC-51280. These TUPs will be subject to all stipulations specified in this ROD

as well as all stipulations specified in the 1992 ROD from the FEIS (except as modified herein). These subject TUAs are listed in Table 2-4 and Appendix C of the Supplement. Legal descriptions for these TUAs are shown in Attachment 1 of this ROD. All TUAs are shown on the official Approved ROW Alignment Sheets for the pipeline and related facilities designated as; "TransColorado Pipeline Project Construction Alignment Sheets."

3. Field Pipeline Realignments and Field Relocation of Temporary Use Areas
Authorize BLM and USFS delegated representatives to approve realigning the staked centerline of the pipeline described in ROW grant COC-51280 as amended, up to a maximum of 100 feet from the staked centerline. All such realignments shall be implemented only with the specific conditions that: 1) the realignment can reasonably be constructed, 2) a determination has been made by the agency archaeologist that no significant cultural resources will be affected, 3) a determination has been made by the agency biologist that no direct effects (e.g. taking) of listed species will occur, 4) a determination has been made by the Authorized Officer's representative that soil and slope stability can be maintained, and erosion will be controlled using methods identified in the project Plan of Development (POD). These realignments will be subject to all stipulations specified in this ROD as well as all stipulations specified in the 1992 ROD from the FEIS (except as modified herein).

Authorize BLM and USFS delegated representatives to approve relocating TUAs a maximum of 100 feet from the original approved TUA boundary, subject to the following conditions: 1) The TUA is no larger than the size originally approved, 2) a determination has been made by the agency archaeologist that no significant cultural resources will be affected, 3) a determination has been made by the agency biologist that no direct effects (e.g. taking) of listed species will occur, 4) a determination has been made by the Authorized Officer's representative that soil and slope stability can be maintained, and erosion will be controlled using methods identified in the project POD. These relocated TUAs will be subject to all stipulations specified in this ROD as well as all stipulations specified in the 1992 ROD from the FEIS (except as modified herein).

4. Revised Environmental Protection Measures
Approve the 18 revised environmental protection measures in the Agency Preferred Alternative, Table 2-6 on the Supplement. These environmental protection measures are shown in Attachment 2 of this ROD, "Revised Table 2-12, TransColorado Gas Transmission Project Environmental Protection Measures for Federal Lands" and Table 2-13, TransColorado Gas Transmission Project Site-Specific Environmental Protection Measures" The amended ROW grant (to include all granted areas encompassing the original granted alignment, all route changes, all realignments and all TUPs) offered to TransColorado will be subject to these revised environmental protection measures, all terms and conditions as specified in this ROD, as well as all terms and conditions specified in the 1992 ROD from the FEIS (except as modified herein).

5. Re-authorization of the 25-foot Wide Temporary Use Area
Offer to TransColorado and grant if accepted a Temporary Use Permit (TUP) for a 25-foot wide temporary use area (TUA) on the Federal lands adjacent to and for the length of the ROW and amended ROW. The purpose of this TUA will be for the construction of one 22 to 24 inch natural gas pipeline associated with ROW COC-51280. This TUP will be subject to all stipulations of this ROD as well as all stipulations of the 1992 ROD from the FEIS. Legal description for this TUA is shown in Attachment 1 of this ROD. The TUA is shown on the official Approved ROW Alignment Sheets for the pipeline and related facilities designated as; "TransColorado Pipeline Project Construction Alignment Sheets."

Additional Mitigation and Monitoring

The amended MLA ROW grant COC-51280 (to include all granted areas encompassing the original granted alignment, all route changes, all realignments and all TUPs)

offered to TransColorado will contain the following additional stipulations and environmental protection measures on Federal lands. These measures are based on environmental concerns which were not fully incorporated into the Final Supplement. The term "holder" refers to the holder of the MLA ROW grant, TransColorado Gas Transmission Company, its successors and assigns. Inclusion of these measures should provide for all practicable means to avoid or reduce environmental harm, in accordance with the requirements under 43, Code of Federal Regulations (43 CFR, Part 2881.2).

6. Hazardous Materials

The holder will be required to provide information on hazardous materials that will be used, produced, transported or stored on the ROW, either temporarily during construction or permanently, in accordance with the requirements of BLM Instruction Memorandum No. 94-253 (Hazardous Materials Management on Rights-of-way, July 28, 1994 and refer to Department of Interior Standard Form 299, Item #19). Currently, three categories of hazardous materials, explosives and blasting agents, paint, and coatings are identified as being brought on site during the project. Based on the use or transport of these materials, during the project by TransColorado on Federal lands, the following stipulations will be included in the amended ROW grant:

a) The holder shall comply with all applicable Federal laws and regulations concerning hazardous materials and toxic substances, existing or hereafter enacted or promulgated. In any event, the holder shall comply with the Toxic Substances Control Act of 1976, as amended (15 U.S.C. 2601, et seq.) with regard to any toxic substances that are used, generated by or stored on the ROW or on facilities authorized under this ROW grant. (See 40 CFR, Part 702-799.) Additionally, any release of toxic substances (leaks, spills, etc.) at or in excess of the reportable quantity established by 40 CFR, Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation and Liability Act of 1980, Section 102b. A copy of any report required or requested by any Federal or State government as a result of a reportable release or spill of any toxic substances shall be furnished to the BLM Authorized Officer concurrent with the filing of the reports to the involved Federal agency or State government.

b) The holder agrees to indemnify the United States against any liability arising from the release of any hazardous substance or hazardous waste (as these terms are defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. 9601, et seq. or the Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6901, et seq.) on the ROW (unless the threatened release is wholly unrelated to the ROW holder's activity on the ROW). This agreement applies without regard to whether a release is caused by the holder, its agent, or unrelated third parties.

c) The holder shall comply with all applicable Federal, State and local laws or ordinances concerning the use, storage and transport of explosives and blasting agents. The holder shall provide the appropriate office of the Bureau of Alcohol, Tobacco and Firearms (BATF), Regulatory Enforcement, with a list of dates and locations for the explosives and blasting agent storage facilities to be used on the Project, at least 14 days prior to the establishment of such storage facilities. In addition, the BLM Authorized Officer in his or her discretion may require the holder to employ additional security measures for the storage or transport of explosives and blasting agents, including but not limited to the use of 24-hour on site security personnel. These additional security measures will be developed through consultation between the BLM Authorized Officer, BATF, appropriate land managing agencies, Federal, State and local law enforcement agencies and the holder.

7. Threatened and Endangered Species

The Holder shall comply with all conservation measures and conservation recommendations contained in the U.S. Fish and Wildlife Service's (USFWS) May 18, 1998, Final Biological Opinion (Attachment 3). The BLM will retain jurisdiction

should the Section 7 consultation process need to be reinitiated at any point during this project. These measures will also be incorporated into the Plan of Development for the project.

8. Sensitive Species

The Holder shall comply with all mitigation measures contained in the Final Biological Evaluation for BLM and USFS "sensitive species" identified for the TransColorado Project(Attachment 4). These measures will be incorporated into the Plan of Development for the project.

9. Department of Transportation; Health and Safety

In accordance with 43 CFR 2881.2(c), TransColorado shall comply with all applicable Federal and State law that will protect the safety and health of pipeline workers and the general public, including, but not limited to, protection against the sudden rupture and slow degradation of the pipeline. This includes compliance with all such applicable measures required by FERC, Department of Transportation (DOT) and appropriate State Agencies of Colorado and New Mexico. TransColorado shall design, construct, operate, and maintain all facilities in accordance with applicable Federal (including DOT) and State law governing pipelines and pipeline construction.

10. Mitigation Measure Modification Requests

Any changes in mitigation measures that apply to activities on Federal lands must be approved in writing, in advance, by the BLM Authorized Officer or delegated Authorized Officer's Representative. TransColorado must request such changes in writing at least 7 days prior to the date that the change in the mitigation measure would take effect. Minor on-site one-time variances to mitigation measures may be approved, in writing, by the BLM/USFS designated Compliance Inspectors on a case-by-case basis.

11. Valid Existing Rights

This MLA ROW shall be subject to all valid existing rights on Federal lands as of the date of the grant and amended grant.

12. Alignment Sheets, Legal Descriptions and TUPs

The Official Approved Alignment Sheets will be part of the amended MLA ROW grant to be offered and granted, if accepted by TransColorado. All TUPs will reference tracking numbers, mileposts, or specific locations along the pipeline centerline on the subject Alignment Sheets and in Appendix C in the Supplement.

13. Plan of Development

TransColorado is required to provide the BLM and USFS a Plan of Development (POD) that details how the pipeline and associated facilities will be constructed. The final POD will become part of the amended ROW grant by reference. The final POD will be completed and approved by the BLM and the USFS prior to the issuance of any construction-related Notice to Proceed (NTP) for Federal lands. If all required environmental protection measures from both the 1992 and 1998 RODs are not included in the POD to the satisfaction of the BLM and the USFS, no construction related NTP will be issued for Federal lands. Prior to any construction or other surface disturbance associated with ROW grant C-51280 or amended ROW C-51280 or related TUPs, the Authorized Officer or delegated agency representative will issue written NTPs. Any NTP shall authorize construction or use only as therein expressly stated and only for the particular location, segment, area, or use described.

14. Strict Liability

Chapter 3 the 1992 FEIS and Chapter 3 and Appendix D of the Supplement to the 1992 FEIS identify specific steep slopes of the San Juan National Forest where the TransColorado Project presents a foreseeable hazard or risk to the United States. These potential hazards or risks are documented in Appendix D of the Supplement to the 1992 FEIS. The slope stability issue of these specific slopes is discussed in: 1) the 1991 "Engineering Geology and Geotechnical Engineering Services, Alternative "J" and Alternative "E" Canyon Crossings, San Juan National Forest, Montezuma County, Colorado, TransColorado Project" by Sergent, Hauskins & Beckwith (SHB); 2) the "Special Geotechnical and Engineering Investigations for the Proposed TransColorado Pipeline Route Through the San Juan National Forest" prepared by

Universal ENSCO Inc. and AGRA Earth and Environmental, dated March, 1998; 3) a letter form AGRA Earth and Environmental entitled "Validity of the 1991 SHB Report on the Engineering Geology and Geotechnical Engineering Regarding Slopes in the San Juan National Forest, Montezuma County, Colorado"; 4) two reports from Dr. Nicholas Sitar titled "Stability Analysis of Soil Strength Parameters for the Proposed TransColorado Pipeline" and an "Addendum to Review of Review of Stability Analysis of Soil Strength Parameters for the Proposed TransColorado Pipeline", dated December 22, 1997 and December 30, 1997, respectively; 5)the AGRA Earth and Environmental January 1998 "Reclamation Plan, Shallow Slope Stability Mitigation Plan, TransColorado Pipeline Company San Juan National Forest" and; 6)the USFS San Juan National Forest April 23, 1998 report, "Comments on TransColorado Pipeline Geotechnical Engineering and Engineering". These impact discussions demonstrate the differences in the professional geotechnical conclusions concerning the slope stability of the specifically identified steep slopes of the San Juan National Forest and that the Project presents a foreseeable hazard or risk to the United States due to geologic hazards, rockfalls and slope instability. These hazards may result in ruptured, damaged or corroded pipe, which may pose a public and environmental safety hazard, including fire and explosion. The costs of suppressing wildland fires caused by these environmental safety hazards would be likely to exceed $1,000,000, depending on the time of year and fire hazard conditions. Damages to highways and other facilities, as well as liability for human injuries, could also exceed this amount. In accordance with the regulations under 43 CFR 2883.1-4, this potential for a foreseeable risk or hazard to the United States requires that the MLA amended ROW grant offered to TransColorado be subject to the following strict liability stipulation:

> "The holder shall be liable for damage or injury to the United States to the extent provided by 43 CFR 2883.1-4. The holder shall be held to a standard of strict liability for damage or injury to the United States resulting from fire, explosion or soil movement (including land slides, slumps and rockfalls, as well as wind and water-caused movement of particles) caused or substantially aggravated by any of the following within the ROW or permit area:
>
> a) Activities of the holder, including but not limited to construction, operation, maintenance, and termination of the facility.
>
> b) Activities of other parties including but not limited to:
> (i) Land clearing and logging.
> (ii) Earth-disturbing and earth-moving work.
> (iii) Blasting.
> (iv) Vandalism and sabotage.
>
> c) Acts of God.
>
> The maximum limitation for such strict liability damages shall not exceed one million dollars ($1,000,000) for any one event, and any liability in excess of such amount shall be determined by the ordinary rules of negligence of the jurisdiction in which the damage or injury occurred.
>
> This requirement shall not impose strict liability for damage or injuries resulting primarily from an act of war or from the negligent acts or omissions of the United States."

The strict liability stipulation contained in MLA amended ROW grant COC-51280 offered to TransColorado will be applied only to the locations on Federal lands managed by the San Juan National Forest described in this ROD in Attachment 5 of this ROD.

15. Steep Slopes Mitigation

All steep slope mitigation and construction measures, and environmental protection measures contained in Appendix D, "Steep Slopes Construction Plan" of the Supplement will be followed. On these designated steep slope locations on the San

Juan National Forest and on the designated Grand Mesa Slopes (Appendix D-2 of the Supplement), these measures will take precedence over general mitigation measures. TUPs issued on these designated steep slopes of the San Juan National Forest, will also be stipulated such that; "TUAs will not be used for the storage of merchantable timber". All NTPs for these same TUAs on the San Juan National Forest will also contain this stipulation.

16. Visual Resource Mitigation
In the visually sensitive areas of the Grand Mesa Slopes Area, the Grand Valley, and the Dolores River Canyon crossing, the BLM Authorized Officer or delegated representative, at his/her discretion will require the implementation of some or all of the visual resource mitigation requirements stated in Attachment 2 of this ROD (Revised Tables 2-12 and 2-13 of the 1992 FEIS) and Appendix D of the Supplement to the 1992 FEIS. Additionally, for the Dolores River Canyon crossing and steep slopes, the final determination of specific visual resource mitigation measures will be at the discretion of the Authorized Officer, following construction. Design holes for tree planting shall be installed in quantity and dimension as directed by the Authorized Officer.

BACKGROUND

The pipeline route, parallel temporary use area (TUA) and associated facilities, such as compressor stations, were evaluated in a 1992 Draft and Final Environmental Impact Statement prepared under the direction of the BLM as the Lead Agency. In 1992, BLM issued a ROD for the pipeline ROW and the USFS issued decisions establishing a utility corridor across the Uncompahgre and San Juan National Forests. On July 20, 1990, TransColorado filed an application with the FERC, for a Certificate of Public Convenience and Necessity to construct and operate pipeline facilities to transport natural gas produced in the Piceance Basin of Northwestern Colorado to an existing major interstate pipeline junction near Bloomfield, New Mexico. A Certificate of Public Convenience and Necessity for the project was issued to TransColorado by the FERC on June 3, 1994 (FERC Docket No. CP90-1777-008).

In 1996 TransColorado sought and obtained approval to construct Phase I of the TransColorado Project. Phase I consisted of a 22.5 mile section of 24-inch outer diameter pipeline that extends from the Blanco Plant approximately 2 miles north of Bloomfield, New Mexico to the vicinity of the Coyote Gulch Gas Plant on the Southern Ute Reservation just south of the Colorado-New Mexico state border. For Phase I the approved TransColorado pipeline route was modified to include a 2.5 mile-long lateral pipeline and eight minor realignments. Phase I facilities were analyzed in a Supplemental Environmental Assessment to the 1992 FEIS (NM 070-96-3180). The BLM Decision Record on the Supplemental Environmental Assessment was signed on August 1, 1996, authorizing the issuance of a ROW amendment and the TUPs needed for construction of Phase I. The Phase I mainline pipeline is connected to the Coyote Gulch Treating Plant by the 2.5 mile lateral pipeline.

In the summer of 1997, TransColorado reinitiated planning to construct the remainder of the permitted pipeline. TransColorado proposes to begin pipeline construction in late June of 1998 within an already-granted 50 foot-wide permanent ROW and the previously granted 25 foot-wide TUP paralleling the ROW. The completed project would extend from the Piceance Basin near Meeker, Colorado to an interconnection with Phase I near The Coyote Gulch Treating Plant.

Planning and information collection undertaken during 1997 and 1998 for the remainder of the permitted pipeline included:

1. A construction planning review of the pipeline route to determine the location and size of Temporary Use Areas (TUAs) that would be needed in addition to the 50 foot-wide permanent ROW and the previously granted 25 foot-wide TUP paralleling the ROW.

2. Pipeline route changes in several locations to avoid environmentally sensitive areas, improve pipeline constructability and address landowner concerns. Route changes are centerline changes greater than 100 feet from the original approved ROW centerline. Proposed centerline changes less than 100 feet from the approved ROW centerline are considered realignments.

3. Investigations to determine locations of storage yards near railheads where pipe would be unloaded.

4. Additional surveys and studies for endangered, threatened, candidate, and BLM and USFS designated "sensitive species", cultural resources, slope stability, watersheds, and wetlands.

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The broader decision to permit the TransColorado Project was made in the 1992 ROD of the FEIS. The Supplement to the 1992 FEIS analyzed specific issues as related to minor project changes and updated information since 1992. As the lead agency, BLM in cooperation with the USFS, evaluated the Proposed Action, the Agency Preferred Alternative, other alternatives and the No Action Alternative for the following specific decision elements analyzed in the Supplement:

Route changes (greater than 100 feet) and realignments (less than 100 feet) from the original centerline of the 1992 ROW grant,

Temporary use areas (TUAs) adjacent to the approved ROW, or proposed route changes or realignments,

Realignments and relocations of temporary use areas at unspecified areas due to conditions encountered during construction,

Revisions to several environmental protection measures approved in the 1992 RODs, and

Re-authorization of the 25 foot temporary use permit (TUP) for the length of the project.

The Proposed Action for these decision issues delineated and analyzed 28 route changes and 32 realignments. A total of 822 separate TUAs requiring 399 acres were contemplated and analyzed under the Proposed Action. The Proposed Action also delineated and analyzed conditions under which realignments and relocation of TUAs could be accomplished during pipeline construction. Revisions to 18 of the environmental protection measures approved in the 1992 ROD were analyzed under the Proposed Action. Additionally, the Proposed Action analyzed the re-authorization of the TUP, for the 25 foot-wide TUA, for the length of the project.

In the Proposed Action Alternative, route change alternatives were analyzed at Watson Creek, Beaver Creek, La Plata and CDOW/Hughes (Supplement, Table 4-1) locations. The Agency Preferred Alternative for route changes consists of all Proposed Action route changes as well as the Watson Creek Route Change Alternative A, one of the Beaver Creek Route Change Alternatives (see Figure 24, Appendix B, Supplement), the La Plate Route Change Alternative B, and the CDOW/Hughes Route Change Alternative. Watson Creek Route Change Alternative B, two of the Beaver Creek Route Change Alternatives, and the La Plata Route Change Alternative A were not selected as part of the Agency Preferred Alternative because they would have resulted in greater environmental impacts than the route changes selected. Both the La Plata Route Change A and Route Change B alternatives cross or are located within 100 feet of 5 recorded Anasazi sites or structures, one reclaimed coal mine, one historic habitation site with what appears to be an Anasazi component, and an undetermined amount of unrecorded Anasazi sites on private land in Section 15. The selected alternative, La Plata Route Change B, avoids the BLM Morris 41 Proposed

Area of Critical Environmental Concern and one other known Anasazi, but does not avoid all of the Route A known Anasazi sites.

No realignment alternatives were identified. For all 822 proposed TUAs, alternatives to the location of site-specific proposed TUA in sensitive areas of steep slopes, geologic hazards, wetlands, riparian areas, and threatened, endangered, or sensitive species areas, and visually sensitive areas were analyzed (Supplement Table 4-3). These alternative TUA locations were not selected because they would have resulted in overall greater environmental impacts than the TUA locations of the Agency Preferred Alternative. No alternative route realignments or relocations of TUAs at unspecified areas during construction, under the specified conditions were analyzed in any of the Supplement alternatives. For revisions to the environmental protection measures, only the Proposed Action and the Agency Preferred Alternative were analyzed as alternatives to the environmental protection measures in the 1992 RODs. No alternatives were analyzed for the re-authorization of the 25 foot-wide TUP for the length of the project including along route changes and realignments.

The No Action Alternative for all decision elements would result in no change from the 1992 ROD decisions. This would result in the TransColorado Pipeline Project being constructed, operated and terminated as authorized in the 1992 RODs and ROW grant. However, no route changes or realignments from the approved 1992 ROW grant would be authorized. No TUAs would be authorized. No realignments of the pipeline centerline or TUAs could occur during construction. All of the environmental protection measures stipulated in 1992 RODs would remain the same. The 25 foot-wide TUP for the length of the pipeline would not be re-authorized. The No Action Alternative was not selected because it would result in greater resource impacts during construction of the project, if the project could be constructed under the No Action Alternative.

Based on the reduction of resource impacts, the Agency Preferred Alternative for all decision elements of the Final Supplement has been approved and incorporated into the separate decision items above. Further reduction of resource impacts will be accomplished by the implementation of the additional stipulations itemized above.

MANAGEMENT CONSIDERATIONS

It is the policy of the BLM to: 1) authorize all ROW uses on federal lands...in the most efficient and economical manner possible...2)manage ROW use of federal lands through a system of...ROW corridors, 3) maximize the use of performance stipulations through the use of construction, operation and maintenance plans..., and 4) assure to the greatest extent possible that all identified impacts are mitigated and that the terms and conditions of the ROW grant are complied with. (paraphrased from BLM Manual 2800).

My decisions in this ROD are consistent with BLM policy. The TransColorado project is in compliance with existing Federal land use plans, including BLM management plans, the Grand Mesa, Uncompahgre, Gunnison National Forest Land and Resource Management Plan as amended in 1992, and the San Juan National Forest Land and Resource Management Plan, as amended in 1992. As authorized by the 1992 RODs from the FEIS, the TransColorado Project will utilize utility corridors, as established under the 1992 USFS decisions in the 1992 ROD. Neither the decisions of this ROD nor amendments to this ROW grant will require an amendment to any existing BLM or USFS land use plans.

On balance, the benefits of implementing the Agency Preferred Alternative as integral portions of the originally approved TransColorado Project outweigh the environmental impacts that would result from leaving the Project as permitted in 1992. The Agency Preferred route changes, realignments and TUAs minimize both natural resource and social impacts. Environmental protection measures stipulated

in the 1992 RODs, along with all environmental protection measures form the Agency Preferred Alternative and the additional mitigation measures stipulated in this ROD will also minimize resource impacts of the project. These measures constitute all practicable means to minimize environmental harm. The application and implementation of these protection measures is detailed in the POD. Monitoring and environmental compliance during construction will insure that all environmental protection measures are completed. All of these considerations have led to the my decision to approve and offer an amended MLA ROW grant and TUPs to TransColorado Gas Transmission Company.

CONSULTATION WITH OTHERS

The USFS was a cooperating agency for the 1992 FEIS. The USFS contributed and cooperated with the BLM in the issuance of the Supplement. Forest Supervisors for the Grand Mesa, Uncompahgre, and Gunnison National Forests, and the San Juan National Forest have concurred with the Agency Preferred Alternative in the Supplement and the Decisions in this ROD. These letters are on file at the BLM's Montrose District Office, Montrose, Colorado.

The USFWS issued a new Final Biological Opinion (BO) for the entire TransColorado project on May 18, 1998 (Attachment 3). In the Final BO, the USFWS concluded that the TransColorado Project is likely to jeopardize the continued existence of the federally listed Colorado squawfish, humpback chub, bonytail chub, and razorback sucker, and result in adverse modification of their critical habitat. Reasonable and prudent alternatives identified in the BO are required to be implemented in this ROD to avoid the likelihood of jeopardy to the listed fishes. To prevent the likelihood of jeopardy to bald eagles, peregrine falcons, Mexican spotted owls, southwestern-willow flycatchers, and Uinta Basin hookless cactus from the project, conservation recommendations in the BO are required by the ROD to be implemented. BLM will retain jurisdiction should Section 7 consultation need to be reinitiated at any time during the project. Additionally, the entire project has been evaluated and a Final Biological Evaluation (BE) prepared for BLM and USFS "Sensitive Species". Mitigation measures detailed in the final BE are incorporated into this ROD in Attachment 4, and the POD to avoid any potential impacts to the species identified.

Cultural resources have been addressed in accordance with Section 106 of the National Historic Preservation Act (NHPA) and implementing regulations under 36 CFR 800. A Programmatic Agreement (PA) between the BLM, the USFS, the Southern Ute Tribe, the Colorado and New Mexico State Historic Preservation Officers (SHPOs) and the Advisory Council on Historic Preservation was signed in 1990 and remains in effect. This PA is located in Appendix F of the FEIS. The PA required a comprehensive treatment plan for known and discovered cultural resources. The 1992 approved Treatment Plan and Research Design for the Cultural Resource Mitigation Phase of the Planned TransColorado Natural Gas Pipeline, Western Colorado and Northwestern New Mexico also remains in effect. This Treatment Plan was approved in 1992 by the Colorado and New Mexico SHPOs and the Advisory Council on Historic Preservation. All approved ROW grant amendments and TUPs will be subject to the provisions of this 1992 Treatment Plan.

This decision fully recognizes FERC's role in directing the nation's development of energy resources in relation to supply and market needs. The FERC has issued to TransColorado a Certificate of Public Convenience and Necessity for the project on June 3, 1994. The FERC will administratively review the route changes, realignments and TUAs proposed by TransColorado prior to issuance of a NTP on private and state lands crossed by the project. TransColorado will utilize the environmental analysis contained in the Supplement to the 1992 FEIS to support their request for FERC approval of these modifications.

TransColorado has applied for a Department of the Army, U. S. Corps of Engineers (COE), permit under authority of Section 40 of the Clean Water Act (CWA) and for

water quality certification under Section 401 of the CWA to temporarily discharge approximately 29,752 cubic yards (cy) of dredge and fill material into waters of the United States and approximately 12,762 cy into jurisdictional wetlands. The U. S. Corps of Engineers, Sacramento District Office is processing this application for permit and certification.

MITIGATION AND MONITORING

The mitigation measures, related monitoring and enforcement activities that were developed through the environmental process, as described in the 1992 FEIS and the Supplement, are incorporated into this ROD by reference. The amended MLA ROW and TUPs for the TransColorado Project will incorporate all mitigation, monitoring and enforcement measures from the 1992 RODs as well as all revised and new mitigation, monitoring and enforcement measures contained in the Agency Preferred Alternative of the Final Supplement and in this ROD. These measures apply to all Federal lands crossed by the ROW and/or TUPs. The implementation of these measures will be detailed in the final Plan of Development (POD). The final POD will become part of the amended ROW grant by reference.

PUBLIC INVOLVEMENT

This project has been the subject of intensive public involvement since the initiation of the FEIS in 1990 and again during the development of the Supplement to the FEIS in 1997 and 1998. All public comment periods, public meetings and review periods were published in the Federal Register and accompanied by a news release. For a listing of the public involvement during the preparation of the 1992 FEIS, please refer to the ROD of the 1992 FEIS.

Chronological List of The Public Involvement
Opportunities During The Preparation of The Supplement

November 21, 1997	Notice of Intent published in the Federal Register
October 21 - December 10, 1997	"Open House" forums held at Norwood, Durango, Delta, Rangely, Dolores and Grand Junction, Colorado
November 15 & 22, 1997	Field Trips to locations on the San Juan National Forest offered to the public
January 23, 1998	Notice of Availability of the Draft Supplement to the 1992 FEIS, with a 60-day comment period
February 17 to 19, 1998	Public meetings on the Draft Supplement held in Durango, Dolores and Grand Junction, Colorado. Written and oral comments accepted
March 18, 1998	Close of comment period for the Draft Supplement
April 24, 1998	Notice of Availability of the Final Supplement with a 30-day review period

In addition to the above listed formal opportunities, numerous informal meetings were held with city, county and state officials, other federal agency officials, local landowners and various interest parties.

Two comment letters were received on the Final Supplement during the 30-day availability period. No changes to the Supplement resulted from the letters. These comment letters and responses from the Authorized Officer will be available for review at the BLM Montrose District Office, Montrose, Colorado.

APPEALS PROCEDURE

This decision may be appealed to the Interior Board of Land Appeals (IBLA), Office of the Secretary, in accordance with the regulations contained in 43 Code of Federal Regulations (CFR), Part 4 and the enclosed Form 1842-1 (Attachment 6). If an appeal is taken, your notice of appeal must be filed with the Bureau of Land Management, Montrose District Manager, 2465 South Townsend Avenue, Montrose, Colorado 81401 within 30 days from receipt of this decision or within 30 days after the date of publication in the Federal Register. The appellant has the burden of showing that the decision appealed from is in error.

If you wish to file a petition pursuant to regulations at 43 CFR 4.21 (58 FR 4939, January 19, 1993) for a stay of the effectiveness of this decision during the time that your appeal is being reviewed by the IBLA, the petition for a stay must accompany your notice of appeal. A petition for a stay is required to show sufficient justification based on the standards listed below. Copies of the notice of appeal and petition for a stay must also be submitted to each party named in this decision and to the IBLA and to the appropriate Office of the Solicitor (see 43 CFR 4.413) at the same time the original documents are filed with this office. If you request a stay, you have the burden of proof to demonstrate that a stay should be granted.

Standards for Obtaining a Stay

Except as otherwise provided by law or other pertinent regulation, a petition for a stay of a decision pending appeal shall show sufficient justification based on the following standards:

(1) The relative harm to the parties if the stay is granted or denied,

(2) The likelihood of the appellant's success on the merits,

(3) The likelihood of immediate and irreparable harm if the stay is not granted, and

(4) Whether the public interest favors granting the stay.

Adverse parties of record who must be served with a copy of the appeal and statement of reasons are:

Mr. C. Kim Blair
TransColorado Gas Transmission Company
79 South State St.
P. O. Box 11450
Salt Lake City, Utah 84147

SIGNATURE

This document constitutes my Record of Decision for the TransColorado Gas Transmission Company amended ROW application COC-51280, as the Bureau of Land Management Authorized Officer, in accordance with the Mineral Leasing Act and the regulations under Title 43, Code of Federal Regulations, Part 2880.

Mark W. Stiles
District Manager, Montrose District
Bureau of Land Management

June 4, 1998
Date

LIST OF ATTACHMENTS

ATTACHMENT 1	EXHIBIT A	LEGAL DESCRIPTIONS FOR BLM LANDS
	EXHIBIT B	LEGAL DESCRIPTIONS FOR FOREST SERVICE LANDS
ATTACHMENT 2		REVISED TABLE 2-12 - ENVIRONMENTAL PROTECTION MEASURES FOR FEDERAL LANDS
		REVISED TABLE 2-13 - SITE-SPECIFIC ENVIRONMENTAL PROTECTION MEASURES
ATTACHMENT 3		BIOLOGICAL OPINION
ATTACHMENT 4		POTENTIAL IMPACTS AND APPLICABLE MITIGATION FOR BLM AND USFS SENSITIVE SPECIES IDENTIFIED FOR THE TRANSCOLORADO GAS TRANSMISSION PROJECT
ATTACHMENT 5		STRICT LIABILITY STIPULATION LOCATIONS, SAN JUAN NATIONAL FOREST
ATTACHMENT 6		INFORMATION ON TAKING APPEALS TO THE BOARD OF LAND APPEALS

revised June 1, 1998

ATTACHMENT 1
EXHIBIT A
PHASE II-TRANSCOLORADO GAS TRANSMISSION COMPANY
LEGAL DESCRIPTIONS FOR BLM LANDS
COC-51280 amend #2

COLORADO

Rio Blanco County, Colorado

T. 2 S., R. 97 W., 6th PM
sec. 21, W SE , and SE SE ;
sec. 28, N NE , SW NE , N SE , and SE SE ;
sec. 33, lots 1, 4, 5, and 12.

T. 3 S., R. 97 W., 6th PM
sec. 3, lots 3 and 4, SE NW , E SW , and SW SE ;
sec. 10, W NE , SE NE , and E SE ;
sec. 14, NW NW ;
sec. 15, NE NE , NE SW , N SE , and SE SE ;
sec. 23, E E ;
sec. 35, W NE , SE NW , and E SW .

T. 4 S., R. 97 W., 6th PM
sec. 2, lot 3, S NW , and W SW ;
sec. 10, SE NE , and E SE ;
sec. 11, W NW ;
sec. 15, E E ;

Garfield County, Colorado

T. 4 S., R. 97 W., 6th PM
sec. 22, E NE , SW NE , and W SE ;
sec. 27, W NE , E SW , and NW SE .

T. 7 S., R. 97 W., 6th PM
Tract 111;

sec. 17, lots 8 and 9;
sec. 19, lot 14;
sec. 20, lots 1 and 2;
sec. 30, lots 5, 7, and 10;
sec. 31, lot 10, W NE , SE NE , and NE SE .

T. 8 S., R. 97 W., 6thPM
sec. 5, S NW , and E SW ;
sec. 6, lots 8 and 9;
sec. 8, N NW , SW NW , and NW SW .

Mesa County, Colorado

T. 8 S., R. 97 W., 6th PM
sec. 20, E NW .

T. 9 S., R. 97 W., 6th PM
sec. 25, W SW , and SE SW ;
sec. 26, N SE ;
sec. 36, NE NW , and E SE .

T. 9 S., R. 96 W., 6th PM
sec. 31, lot 4.

T. 10 S., R. 96 W., 6th PM
sec. 6, SW NW .

T. 10 S., R. 97 W., 6th PM
sec. 27, E NE , and SE SW ;
sec. 34, E W .

T. 11 S., R. 97 W., NMPM
sec. 2, lots 19, 22, 23, 26, 30, and 31;
sec. 18, SW NE , W SE , and SE SW ;
sec. 19, E NW ;
sec. 30, lots 2, 3, and 4;
sec. 31, lots 5 and 7, E NW , and NW SW .

T. 11 S., R. 98 W., 6th PM
sec. 36, lot 4.

T. 12 S., R. 98 W., 6th PM

sec. 1, lots 5, 6, 10, 11, 15, 16, and 17;
sec. 11, lot 6;
sec. 12, lots 3, 4, and 5.

T. 2 S., R. 2 E., Ute PM
sec. 1, lots 1, 2, and 3;
sec. 2, S NE , SE NW , and NW SE ;
sec. 3, SW NE , and S NW ;
sec. 4, S NE , and NW SW ;
sec. 8, E SW ;
sec. 16, SW SW ;
sec. 17, E E ;
sec. 21, W NW ;
sec. 27, SW SW ;
sec. 28, SW NE , N NW , SE NW , N SE , and SE SE .

T. 3 S., R. 2 E., Ute PM
sec. 2, SW SW ;
sec. 9, E SE ;
sec. 10, E NE , SW NE , SE NW , and N SW ;
sec. 11, NW NW ;
sec. 15, W NW , SE NW , NE SW , W SE , and SE SE ;
sec. 22, NE NE ;
sec. 23, W NW , and SE NW ;
sec. 25, W NW , SE NW , and S NE .

T. 14 S., R. 89 W., 6th PM
sec. 1, S NW , NE SW , N SE ,and SE SE ;
sec. 2, lot 2, and SE NE .

Delta County, Colorado

T. 14 S., R. 89 W., 6thPM
sec. 1, SE SE .

T. 14 S., R. 97 W., 6th PM
sec. 6, lot 7;
sec. 7, lots 1, 5, and 6, E NW ,and NW SE ;
sec. 35, lots 3 and 4.

T. 4 S., R. 3 E., Ute PM
sec. 3, SW SW ;
sec. 4, lots 3 and 4, SE NW , SW NE , N SE , SE SE ;
sec. 10, W NE , SE NE , N NW ;
sec. 11, SW NW , N SW , N SE , SE SE ;
sec. 12, SW SW ;
sec. 13, W NW , N SW , SE SW ;
sec. 24, SW NE , E NW , W SE , SE SE .

T. 15 S., R. 97 W., 6th PM
sec. 2, lots 1, 2, 3, and 4;
sec. 11, lots 1 and 2;
sec. 13, SE NE .

T. 15 S., R. 96 W., 6th PM
sec. 18, lot 3.

T. 51 N., R. 12 W., NMPM
sec. 12, lot 4;
sec. 13, W NW ;
sec. 24, N NE , NE NW , NE SE .

Montrose County, Colorado

T. 51 N., R. 12 W., NMPM
sec. 24, SE SE ;
sec. 25, E NE .

T. 51 N., R. 11 W., NMPM
sec. 30, lots 2, 3, and 4, and SE SW ;
sec. 31, SW NE , E NW , W SW , and NW SE .

T. 50 N., R. 11 W., NMPM
sec. 5, S SW ;
sec. 6, lot 2, SW NE , N SE , and SE SE ;
sec. 8, E NW , W SE , and SE SE ;
sec. 21, S NE , and E SE ;
sec. 22, SW SW ;
sec. 27, W NW , SE NW , NE SW , and W SE ;
sec. 34, N NE , SE NE , and NE SE ;
sec. 35, W SW , and SE SW .

T. 49 N., R. 11 W., NMPM
sec. 2, lot 3, SW NE , SE NW , NE SW , and S SW ;
sec. 9, SE SE ;
sec. 10, N NE , SW NE , SE NW , N SW , and SW SW ;
sec. 11, NW NW ;
sec. 16, N NE , SW NE , SE NW , E SW , and SW SW ;
sec. 20, E NE , S SW , and N SE ;
sec. 21, W NW ;
sec. 29, NW NW ;
sec. 30, lot 4, E NE , SW NE , SE NW , and N SW ;
sec. 31, lots 1, 2, 3, and 4.

T. 49 N., R. 12 W., NMPM
sec. 36, SE SE .

T. 46 N., R. 13 W., NMPM
sec. 19, SE SE ;
sec. 20, lots 1 and 2, NE NE , SE NW , N SW , and SW SW ;
sec. 30, lot 2, and N NE .

T. 46 N., R. 14 W., NMPM
sec. 24, SE SE ;
sec. 25, N NE , SW NE , and S NW .

T. 45 N., R. 14 W., NMPM
sec. 4, lot 1.

San Miguel County, Colorado

T. 45 N., R. 14 W., NMPM
sec. 32, NW SE .

T. 44 N., R. 14 W., NMPM
sec. 9, S SW .

T. 43 N., R. 14 W., NMPM
sec. 2, S NE ;
sec. 25, SE NW .

Montezuma County, Colorado

T. 36 N., R. 12 W., NMPM
sec. 32, NW SW .

La Plate County, Colorado

T. 36 N., R. 12 W., NMPM
sec. 32, NW SW , and SE SW .

NEW MEXICO

San Juan County, New Mexico

T. 32 N., R. 13 W., NMPM
sec. 15, W SW ;
sec. 22, SE NE , and NE SE ;
sec. 23, S S ;
sec. 24, lot 4, N SW ,SW SW ,N NE , and SW NE .

T. 32 N., R. 12 W., NMPM
sec. 17, lot 16;
sec. 19, lot 1, N NE , and NE NW ;
sec. 20 N N .

ATTACHMENT 1
EXHIBIT B
PHASE II-TRANSCOLORADO GAS TRANSMISSION COMPANY
LEGAL DESCRIPTIONS FOR FOREST SERVICE LANDS
COC-51280 amend #2

Montrose County, Colorado

T. 48 N., R. 12 W., NMPM
sec. 2, lots 1, 2, 6, 7, 11, 12, and 13, and W SW ;
sec. 10, SE NE , and E SE ;
sec. 11, W NW ;
sec. 15, NE NE , and SW NE ;
sec. 22, W NE , SE NW , N SW , and N SW SW ;
sec. 28, E NE , and NE SE ;
sec. 33, E E .

T. 47 N., R. 12 W., NMPM
sec. 10, SE NW , and E SW ;
sec. 15, E NW , and N SW ;
sec. 16, E SE , and SW SE ;
sec. 20, SE SE ;
sec. 21, W NE , SE NW , NE SW ,W SW ;
sec. 29, NE NE , W NE , SE NW , NE SW , and W SW ;
sec. 30, SE SE ;
sec. 31, lots 2 and 3, N NE , SW NE , and SE NW .

T. 47 N., R. 13 W., NMPM
sec. 36, lots 3, 4, and 5.

T. 46 N., R. 13 W., NMPM
sec. 1, lots 2 and 3, S NW , and NW SW ;
sec. 10, SE NE , W SE , and SE SW ;
sec. 11, NE NW , N NW , and SW NW ;
sec. 15, N NW , and SW NW ;
sec. 16, SE NE , N SE , and SW SE .

San Miguel County, Colorado

T. 44 N., R. 14 W., NMPM

sec. 14, W SW ;
sec. 15, N N , SE NE , and NE SE ;
sec. 23, W NW , SE NW , E SW , and SW SW ;
sec. 26, E NW , SW NW , and W SW ;
sec. 35, W W , and SE SW .

Dolores County, Colorado

T. 40 N., R. 14 W., NMPM
sec. 33, N NE , SE NE , and E SE .

T. 39 N., R. 14 W., NMPM
sec. 4, lot 1, SE NE , and E SE ;
sec. 9, E NE ;
sec. 16, E E .

Montezuma County, Colorado

T. 39 N., R. 14 W., NMPM
sec. 21, NE , and W SE ;
sec. 27, W SW , and SE SW ;
sec. 28, N NE , SE NE , and NE SE ;
sec. 34, W NE , SE NE , NE NW , NE SE , and W SE .

T. 38 N., R. 14 W., NMPM
sec. 3, lots 1 and 2, SE NE , and E SE ;
sec. 10, E NE ;
sec. 11, SE NE , N NW , and NE SE ;
sec. 12, SW , and S SE ;
sec. 13, NE NE .

T. 38 N., R. 13 W., NMPM
sec. 17, N SW , SE SW , and SW SE ;
sec. 18, lot 1, E NW , SW NE , and N SE ;
sec. 20, W NE , SE NE ;
sec. 21, SW NW and W SW ;
sec. 28, N NW , SE NW , NE SW , W SE , SE SE ;
sec. 33, E NE ;
sec. 34, SE NE , SW NW , W SW , SE SW , S SE , NE SE ;

T. 37 N., R. 13 W., NMPM
sec. 2, lot 2, S NE , E SE , and SW SE ;

sec. 11, N NE , SE NE , and SE SE ;
sec. 12, SW NW , and W SW ;
sec. 14, NE NE , and E SE ;
sec. 23, E NE ;
sec. 24, S NW , and E SW ;
sec. 25, W NE , NE NW , E SW , NW SE ;

T. 37 N., R. 12 W., NMPM
sec. 31, lots 2 and 3, E SW , and SW SE .

T. 36 N., R 12 W., NMPM
sec. 6, SW NE , and W SE ;
sec. 7, NW NE , E NE , E SE ;
sec. 8, SW SW ;
sec. 17, W W ;
sec. 18, NE NE ;
sec. 20, W NW ;
sec. 29, W NE , N NW , SE NW , and E SW .

La Plata County, Colorado

T. 36 N., R. 12 W., NMPM
sec. 32, NE NW , SW NW , and NW SW .

ATTACHMENT 2

Revised Table 2-12

TransColorado Gas Transmission Project
Environmental Protection Measures for Federal Lands

The measures listed in this table will be attached as written to the BLM amended ROW grant. These measures are required unless waived by the Federal authorized officer or Federal project inspector and, where applicable, the Federal line manager. These measures apply to the original ROW grant, TUPs, the amended ROW grant, and any other applicable aspect of the pipeline (see the 1998 Final Supplement to the 1992 TransColorado FEIS and the Record of Decision for the Final Supplement). Prior to issuing a waiver, the affected land management agency will conduct an environmental review to determine if additional analysis is needed. Measures that are shaded are the revised measures from Table 2-6 of the Supplement to the 1992 TransColorado FEIS.

AIR QUALITY

1. Federal, state, and local air quality emission standards and regulations will be met.

2. Water, or other means, to control dust will be provided in accordance with Federal, local, or state requirements.

3. Construction and operation equipment will be properly maintained to reduce emissions.

4. Dust abatement procedures shall be used at all times when working within 500 feet of the power transmission line ROW, unless waived by the owner/operator of the power line.

5. Compressor stations will be designed to limit noise levels to 50 dBA at all occupied residences between 7:00 p.m. and 7:00 a.m., and 55 dBA during the day.

TOPOGRAPHY

1. In areas of unstable slopes, active faults, and locations of mines, proper mitigation will be developed (e.g., alternate locations, stronger pipe, installation of monitoring equipment, installation of block valves to isolate area, use of low-density backfill to allow for pipe movement, subsurface drainage, and buttressing) from geotechnical investigations completed during engineering of the pipeline.

2. Site-specific geotechnical evaluations of compressor sites will be conducted prior to construction to determine foundation requirements.

3. Fault crossings will be assessed and site-specific mitigation measures will be developed (i.e., thicker pipe walls, shut-oft valves, and low-density backfill) to maintain safety of pipeline.

MINERALS

1. To ensure that the owner of coal lease C-029889 does not lose the potential to mine the coal under the pipeline, a condition will be attached to the ROW grant. Basically, if the mine plan is required to be modified to provide subsidence protection for the pipeline, the ROW holder will be required to make changes in the location, operation, or design of the pipeline such that the mine plan can proceed without modification. This condition will be spelled out in greater detail in the ROW grant.

ATTACHMENT 2

Revised Table 2-12

TransColorado Gas Transmission Project
Environmental Protection Measures for Federal Lands

SURFACE WATER QUALITY

General Construction

1. Sediment filter devices will be installed, inspected, and repaired to minimize sedimentation where needed or required.

2. Proper riprap application or other techniques will be used to stabilize stream banks where needed or required.

3. Proper water management techniques will be used to prevent silt from entering water channels.

4. Natural drainage will be protected and restored to original contour and patterns to reclaim site.

5. Drainage structures will be installed as necessary to maintain natural surface drainage.

6. Sediment filter devices will be maintained at base of slopes located adjacent to streams until ROW revegetation is complete.

7. The pipeline will be located at least 50 feet from springs unless waived by the affected line manager and the authorized officer,

8. Exact locations of water wells will be determined prior to construction and the pipeline rerouted to maintain a minimum of 50 feet of clearance from the well.

9. Should a water supply well or spring be adversely affected during construction, an emergency source of potable water will be provided until TransColorado has restored the system. Such repairs will be made immediately following construction in that immediate area.

10. In narrow and deep drainages, with little likelihood of further incision, crossings will be based on required and approved site-specific engineering design to be provided and approved in the Plan of Development. These designs will be required on drainages of any width.

11. In incised drainages, crossings will be based on required and approved site-specific engineering design to be provided and approved in the Plan of Development. These designs will be required on drainages of any width.

12. To protect groundwater from accidental fuel spills and contamination, no vehicles will be fueled within a 200-foot radius of all private wells and a 400-foot radius of all municipal water wells.

13. USFWS, the State Fish and Game Departments, EPA, Colorado Department of Public Health and Safety, New Mexico Environment Department and other appropriate state agencies will be consulted regarding withdrawal and disposal of hydrostatic test water.

14. No dredged or fill material will be discharged in the proximity of a public water supply intake (municipal watersheds).

15. A spill prevention and countermeasure plan will be included in the construction contract specitications.

ATTACHMENT 2

Revised Table 2-12

TransColorado Gas Transmission Project
Environmental Protection Measures for Federal Lands

Stream Crossings

1. Staging areas will be located at least 100 feet from stream bank on BLM and on USFS lands to maintain butter zone and avoid water pollution unless waived by the affected line manager and the authorized officer due to topographic restrictions.

2. No storage of fuels or petroleum products will be allowed within 100 feet of any stream bank to avoid water pollution.

3. Perennial stream crossings will be constructed during the low water period or as approved by the authorized officer.

4. State-issued stream crossing permits will be obtained, if required.

5. Section 401 water quality certification waiver will be obtained if required.

6. Stream crossing will be constructed perpendicular to the channel as engineering and routing conditions permit to minimize length of disturbance.

7. Stream banks will be backfilled as close as possible to original contour, using gravel or riprap, if necessary

8. Construction equipment in flowing streams will be limited to that needed to construct the stream crossing. Other construction equipment will cross streams on culverts or portable bridges to reduce sedimentation and bank degradation.

9. Minor perennial stream crossings (streams less than 10 feet wide) will be completed within 24 hours, if possible.

10. Major stream crossings (streams more than 10 feet but less than 100 feet wide) will be completed within 72 hours, if possible.

11. Site-specific construction plans will be submitted to applicable federal agencies for crossing all rivers wider than 100 feet.

12. Authorities responsible for potable water supplies located within 3 miles downstream will be notified at least 72 hours prior to instream work.

13. State authorities will be notified at least 48 hours prior to commencement of instream or blasting in major stream crossings.

14. Trench breakers, to prevent groundwater migration, will be installed at the pipeline trench entrance and exit of all encountered wetlands and shallow aquifers, including those associated with streams and rivers.

15. Low-water crossings will be constructed so as not to block or restrict the existing channel.

16. Low-water crossings will be rehabilitated using material removed during construction to avoid new borrow areas.

17. Flow or spoil off ROW will be prevented to minimize downstream sedimentation.

18. Stream flow will be maintained to protect fisheries and aquatic habitat during construction of stream crossings.

19. The ROW will be aligned to avoid individual trees, snags, or groups of trees, which are significantly taller than the surrounding trees or which are located in an otherwise treeless area. In riparian zones where the riparian woodland consists of scattered old cottonwoods with an understory of seedling or sapling cottonwoods, the ROW will be aligned to remove the smallest possible number of old cottonwoods, with avoidance being preferable.

20. Irrigation ditches and canals will be periodically monitored for two seasons after construction to ensure the integrity of the ditch and canal banks.

21. All permanently lined irrigation ditches and canals will be bored unless waived by the authorized officer and irrigation company.

22. Mudboards will be installed to provide a working surface for equipment on unstable areas as determined by the authorized officer.

23. When the pipeline crosses streams less than 10-feet wide, either flume pipe or other prior approved method by the authorized office will be used. This approval will include timing and other provisions required by the authorized officer.

24. Rock waterways may be constructed for bank stabilization where high seasonal flows are expected. Only one cubic yard of material per running foot will be placed below the ordinary high water mark. This activity would require approval by the Corps under a Nationwide permit, a regional bank stabilization permit, or an individual permit.

25. Major stream crossings will be by the open-cut trench method utilizing tracked backhoes.

26. Abandoned water diversions will be plugged and filled to prevent trapping fish.

27. Streamed sediment at the Dolores and San Miguel River crossings in Colorado will be tested for mine waste sediment contamination. If contaminants are found, a site-specific mitigation plan to reduce or prevent re-suspension of contaminated sediments will be prepared and submitted to the authorized officer. Excavated sediments that are found to be contaminated will be disposed off-site in accordance with all local, state, and Federal regulations.

28. Streambed sediment at the La Plata crossings in New Mexico will be tested for toxic metals. Sampling and analytical testing methods will be reviewed and approved by the USFWS New Mexico Field Office and COE prior to implementing the sampling program. If contaminants are found, TransColorado will initiate discussions with the USFWS to develop site-specific protection measures

29. The pipeline will be buried at a depth adequate and with pipe protection measures adequate to safely withstand a 100-year flood at all stream crossings.

30. Pipeline protection measures will be taken where erosional processes over time reduce pipeline flood protection.

31. All aboveground facilities will be located outside of 100-year floodplains.

32. Major storage yards used during construction will be located outside of 100-year floodplains.

Water Use

1. Water withdrawal permits will be obtained for hydrostatic testing and dust control to protect water rights.

2. Proper intake procedures will be used to prevent entrainment of fish and maintain flow rates in source streams.

3. Discharge permits (e.g., local, state, NPDES) will be obtained for hydrostatic test water disposal.

4. Hydrostatic test water will be sampled during discharge and treated, if necessary. in accordance with permit to avoid pollution. Hydrostatic testing water in New Mexico will be tested for volatile compounds and metallic particles. Testing and treatment methods will be reviewed by the USFWS New Mexico Field Office prior to the retum of any testing water to the rivers in New Mexico.

5. Dispersion devices or containment structures will be used when discharging test water to avoid erosion.

6. No more than 5 percent of current stream flow will be withdrawn from any source.

7. ~~Hydrostatic test water will not be discharged into HQ1 and HQ2 streams.~~

The measure is deleted in its entirety. See Table 2-6, Supplement.

WETLANDS

1. Wetland areas will be avoided to maximum extent possible

2. Staging areas will be located at least 100 feet from wetland edge 100 feet on BLM and USFS lands to maintain buffer zone and avoid water pollution unless waived by the affected land manager and the authorized officer due to topographic restrictions

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3. Petroleum products will not be stored within 100 feet of wetlands to avoid water pollution.

4. Construction of above ground facilities will not be permitted in Federally delineated wetlands and all areas located in 100-year floodplains.

5. Sediment filter devices will be installed to prevent spoil drift and sedimentation where needed and required.

6. State-issued wetland crossing permit will be obtained, it required.

7. Construction ROW in wetland crossings will be less than 75 feet wide to minimize disturbance.

8. Proper clearing techniques will be utilized, leaving roots in place to maintain stability of soils.

9. Wide-track or balloon-tire construction equipment (or proper equipment pads) will be utilized to minimize disturbance.

10. No fertilizer or lime will be used in reclamation activities to prevent eutrophication of wetlands.

11 Soil. rock, tree stumps, or brush riprap will not be used to stabilize ROW to avoid altering the substrate.

12. Sediment filter devices will be installed and maintained at the base of all slopes adjacent to wetlands after construction.

13. Trees and/or native woody vegetation will be replanted in disturbed riparian areas to minimize visual intrusions.

14. Native herbaceous and woody plant species will be monitored to ensure they permanently revegetate.

15. Proper construction techniques will be used to prevent silt from flowing into wetlands.

16. ROW will be aligned to avoid beaver ponds or artificial ponds.

17. Agreements with livestock permittees will be developed to provide short-term protection of stream banks from livestock.

18. Construction across narrow wetlands (<200 feet) will consist of using a work pad (mud board) for the equipment, and the pipe will be placed as though it were on dry ground.

19. Construction across wide wetlands (>200 feet) will consist of laying prefabricated sections of the pipe into the trench, utilizing flotation devices.

20. All disturbed wetlands will be restored to original contours. Disturbed areas will be limited to the minimum necessary to construct the pipeline. In jurisdictional wetlands, the top 6 to 12 inches of the trench will be backfilled with topsoil from the trench, and any exposed slopes and streambanks will be stabilized immediately upon completion of the utility line.

SOILS

1. Topsoils will be stripped from disturbed areas to a depth of 12 inches or to a depth specified by the land managing agency. The land managing agency may also specify the width of topsoil to be stripped, but the minimum width should encompass the area over the trench. Diligent care will be taken to insure topsoil is not incorporated into the trench. Excess spoil will not be left on the topsoil.

2. On saline soils (shale badlands) the top 6 inches of soil over the area to be excavated will be stripped, windrowed, and replaced after construction to encourage revegetation by native seeds present in the topsoil.

3. Steep slopes will be graded properly to minimize erosion.

4. Cuts and fills will be minimized to reduce the amount of exposed soils.

5. Proper blasting techniques will be used to aid in safety and minimize disturbance.

6. Proper trenching techniques will be used to minimize disturbance.

7.Construction restriction on the ROW and TUAs, including temporary shutdown, may be required during wet weather. The amount of permissible rutting on the ROW and TUAs will be determined on a site-specific basis by the Authorized Officer. Criteria for deterring permissible rutting will include: minimal off-site soil movement or sedimentation from the ROW or TUAs, and any potential long term damage to resources outside of the ROW or TUAs. No blading of materials off the ROW or TUAs such as into adjacent vegetation or trees, or over fill slopes will be allowed.

8. Cut and fill will not be used unless side slopes exceed 3 percent to minimize soil exposure and erosion.

9. Proper backfilling with compaction and contouring will be done to aid in site reclamation.

10. Backfill will be mounded over trench approximately 0.5 foot to account for subsidence unless otherwise requested by the authorized officer.

11. Topsoil replacement will be performed over entire disturbed area, sufficient for refilling and mounding.

12. Either temporary or permanent erosion control measures shall be initiated within 10 days after the trench is backfilled to aid in site stabilization.

13. Water bars shall drain away from disturbed area and begin and end in vegetation or rock.

14. Excess or unsuitable materials will be disposed of at approved locations.

15. Permanent water bars will be constructed to control runoff. Spacing will be as noted in the table below or as directed by the affected line manager or authorized officer. Other techniques or devices to control runoff may be substituted for water bars with approval by the appropriate authorized officer.

Slope %	Spacing
0 to 2	400 feet
2 to 5	300 feet
5 to 10	200 feet
10 to 20	100 feet
20 +	50 feet

Where site specific slope construction and mitigation is designated and required, those measures will supersede this requirement.

16. Sediment barriers will be installed and maintained at the base of slopes located adjacent to road crossings until ROW revegetation is complete, or as directed by the authorized officer.

17. Noxious weed-free sediment barriers will be installed at stream, river, and wetland crossings to minimize sedimentation.

18. Trench breakers will be constructed on all slopes that drain into perennial streams or wetlands or onto improved roads, to prevent the channeling of runoff or the migration of water along the trench. Trench breakers should also be constructed immediately down slope of any location where groundwater could enter and migrate along the trench at any time of the year. Trench breakers will be constructed to the specifications contained in the FERC "Upland Erosion Control, Revegetation and Maintenance Plan." Trench breaker spacing may also be identified during onsite evaluations as directed by the Authorized Officer.

19. Topsoil will not be used for the construction of trench breakers.

20. Snow will not be mixed with fill or topsoil during construction to avoid soil losses.

21. Compacted soils in agricultural areas will be relieved so that bulk density of soils on ROW approximates that of soils on adjacent undisturbed agricultural areas to maintain soil productivity.

22. Compacted soil conditions will be relieved before topsoil is replaced.

23. Topsoil will not be redistributed if the ground or topsoil is frozen.

24. Rocks on ROW will be removed to approximate pre-construction conditions.

25. Any blasting near the power transmission line ROW shall include blasting mats or berms so that flyrock or debris will not damage the transmission facilities. Utilities shall be notified prior to all blasting in the ROW.

SOLID WASTE

1. Construction sites will be maintained in a sanitary condition.

2. Waste will be disposed of at an authorized disposal site.

3. A litter policing program will be implemented to avoid litter and visual impacts.

VEGETATION

1. Appropriate clearing techniques will be utilized to preserve roots, stockpile or dispose of vegetation wastes to maintain stability of site, and provide erosion control.

2. Construction and reclamation bond will be provided to ensure reclamation.

3. Non-linear ROW techniques (teathering) will be used to minimize visual impacts in areas as determined by the authorized officer.

4. Native species will be incorporated as practical in the reseeding mixture.

5. The SCS or the affected land management agency will be included in reclamation planning for site-specific information (e.g., noxious weed control, temporary erosion control, and the optimal

time for seeding.

6. Seedbed preparation will be conducted to 3-to 4-inch depth to enhance revegetation (scarifying, tilling, harrowing).

7. Seeding will be conducted during the normal seeding season with proper seed mixture and techniques (certified seeds, proper seeding, and amount). TransColorado will meet with each field office to develop site-specific seeding plans prior to commencing construction. The specific seed mixtures will be included in the plan of development.

8. Approved mulch application will be used in sensitive areas (dry, sandy, steep slopes) to control erosion, as directed by the affected line manager or authorized officer.

9. Where wood chips are used as mulch, topdress will be with nitrogen at rates specified by the authorized officer.

10. Thatching or fiber blankets will be used on stream banks and areas of high erosion potential to control erosion, if needed.

11. Special land preparation will be accomplished on "critical areas" to control erosion and enhance revegetation.

12. Continuing revegetation efforts will be provided to ensure adequate cover until vegetation is established.

13. Procedures for application of herbicides, pesticides, and fertilizers will be identified where needed.

14. Cleared vegetation will be disposed of as directed by the authorized officer.

15. Weed will be used within 12 months of testing to assure seed viability.

16. Seed will be drilled, where feasible, to enhance germination.

17. If broadcast or hydroseeding methods are used, seeding rates will be double the recommended seeding rates.

18. Inspection will occur after first and second growing seasons to determine need for further restoration.

19. Revegetation success will be monitored for the life of the project. Problem areas will receive additional revegetation efforts.

20. Noxious weed control measures will be implemented on the ROW for at least 5 years after construction.

21. Mulch, when used, will be anchored immediately after placing to minimize loss by wind and water.

22. Construction vehicles must arrive at the site in a clean and weed free condition.

23. Fertilizer will be used to enhance vegetation where recommended.

ATTACHMENT 2

Revised Table 2-12

TransColorado Gas Transmission Project
Environmental Protection Measures for Federal Lands

FORESTRY

1. Merchantable timber will be purchased by TransColorado.

2. Unmerchantable timber may be hauled off site or scattered on the ROW, as directed by the authorized officer.

3. If timber is scattered, it shall be done after seeding.

4. Unmerchantable timber may be left on the ROW as a barrier to vehicular traffic and to impede erosion.

5. Trees less than 6 inches in diameter at ground level within the ROW will be cut (either by hydroaxe, hand cut, or other prior approved method). Trees greater than 6 inches in diameter of ground level will be felled. In no circumstances will trees be pushed over except in the actual trench where stumps will be pulled during trenching. In areas selected by the line manager, trees suitable for firewood will be cut and stacked on adjacent open roadways for public removal.

6. Trees hung up during telling will be put on the ground immediately as a safety measure.

LIVESTOCK GRAZING

1. Grazing determent plans may be developed with landowners and grazing permittees to minimize grazing disturbance until ROW revegetation is complete.

2. All damaged livestock facilities (fences, water sources) will be repaired to landowner's satisfaction. Temporary fences will be installed when necessary, to prevent livestock movement across fences temporarily removed for construction.

3. Compensation or temporary measures will be provided for any critical facilities (such as watering sites) that are disrupted during the construction and restoration process.

4. Fences or other suitable barriers will be built to replace natural livestock barriers that would be or removed by pipeline construction.

WILDLIFE

1. Seasonal closures will be observed for elk, deer, antelope, sage grouse, heron, and other specified species unless waived by the authorized officer.

2. All non-essential access roads would be closed along the operational ROW to minimize disturbance impacts to wildlife.

3. A nesting raptor survey will be conducted prior to construction.

THREATENED OR ENDANGERED SPECIES

1. Construction will be restricted in key bald eagle wintering areas between November 15 and April 15, unless waived or modified by the authorized officer.

2. Construction near active (listed proposed and candidate species) raptor nests will be restricted between February 1 and August 15 (distance restrictions and dates vary with raptor species) unless waived or modified by the authorized officer.

3. Site-specific mitigation plans will be developed with the US Fish and Wildlife Service for any impacted threatened or endangered species. Presence/absence surveys will be conducted within suitable habitat along the ROW, TUAs, or access routes during the appropriate flowering period (i.e., April and May) for Uinta Basin hookless cactus. An additional 30-day period will be included in the constraint window to allow for salvage and transplanting. Therefore, the overall surface constraint period will be April through June. Individual plants that are documented during these surveys will be mapped and reported to the USFWS and BLM. Occupied areas adjacent to the pipeline will be flagged and protected. A qualified biologist will transplant all Uinta Basin hookless cactus within areas proposed to be disturbed by the Project, including the ROW, TUAs, and access routes. Transplants will be moved into suitable habitat on public land adjacent to the Project area, in accordance with the specified transplanting methods or other proven techniques developed by Mesa State College. Appropriate site-specific protection measures will be implemented for transplant sites, as identified in the USFWS 1992 Opinion. Protection measures may include staking, flagging, on-site monitoring, etc. Using a third-party contractor and a monitoring plan approved by USFWS and BLM, TransColorado will monitor the transplanted individuals at Kannah Creek and DeBeque for a period of 5 years following transplanting. As part of the monitoring effort, some of the transplants will be retransplanted back into the disturbed areas. For listed fish species, any depletions of water from occupied habitat for listed fishes would be mitigated by paying a one-time fee for every acre foot of depletion in accordance with the current USFWS guidelines.

4. The construction ROW will be aligned to avoid identified bald eagle winter roost trees.

5. Pipeline maintenance will be scheduled to avoid crucial bald eagle and raptor use periods.

6. Emergency maintenance in crucial bald eagle or raptor areas will require notification of the land management agency, the USFWS, and the CDOW or the New Mexico Game and Fish Department.

7. Construction will not be allowed during the Colorado squawfish spawning period (mid-June through mid-August) in the Gunnison and Colorado Rivers. A construction constraint period for the Gunnison River crossing also will be required during the reintroduction period of the razorback sucker. This period typically extends from September into October, depending on the USFWS's release schedule. When considering both the razorback sucker and the Colorado squawfish, the preferred construction period for the Gunnison crossing will be mid-August through mid-September, depending on the razorback's reintroduction schedule, in coordination with the U.S. Fish and Wildlife Service.

8. A study will be designed and completed to document the impact of construction of pipeline crossings on water quality and fish in the La Plata River. Studies will be coordinated with the USFWS in Albuquerque and will include testing for toxic metals.

WILD HORSES

1. During construction, cuts will be made in open trenches (at BLM specified intervals) in the Spring Creek Basin horse range to allow horses to cross the open trench.

CULTURAL RESOURCES

1. TransColorado shall comply with the treatment plan developed and approved by BLM, USFS, SHPO, FERC, and the Advisory Council on Historic Preservation.

2. A cultural resource awareness program will be developed and conducted by TransColorado prior to construction to minimal impacts to archaeological sites.

PALEONTOLOGY

1. Two sensitive paleontological sites found during an inventory of the Wasatch Formation will be monitored during construction.

VISUAL RESOURCES

1. In all disturbed areas provide successlul regeneration of plant cover including indigenous species.

2. The ROW construction clearing will be limited to an agreed upon ROW (nominally 50 feet) based on a site-specific plan to be included in the Plan of Development on the Grand Mesa slopes within the areas identified on Figure 2-3 of the Final SFEIS. Specifically, these visually sensitive areas are located within the Watson Creek and Sink Creek drainages. Within these identified visually sensitive areas, the trench spoil will either be used as a temporary roadbed or stockpiled in nearby less sensitive areas (e.g. unseen) and subsequently hauled back to the site where it was originally removed.

3. Existing parallel roads or utility corridors will be used as pant of the disturbed zone for access or stockpiling.

4. ROW construction clearing will be extended beyond the standard 75-foot width to create a more natural effect on the final EIS agency preferred route from above Dolores to Mancos Hill.

5. Road cuts will be kept at an angle at or near road crossings shown in Appendix G where the ROW is in long view of the road.

6. The boundary of the ROW will be feathered to minimize straight, non-natural lines, especially in forested areas as directed by the authorized officer.

7. Conifers of sufficient height and density to screen views of ROW will be planted in locations shown in Appendix G or as directed by the authorized officer.

8. The pipeline will be consolidated into a common corridor with existing, nearby utilities when the utilities would be visible in separate corridors (Appendix G).

9. Pipeline will be re-routed to a less topographically prominent position where a significantly less visible alignment exists nearby (Appendix G).

10. Visual intrusions of compression and metering facilities will be mitigated as specified by the authorized officer. Some specific measures include:

- limit disturbance to minimum area necessary;
- perform careful, detailed siting and design of facilities to minimize visual contrast, and take advantage of topographic or vegetative screening; and
- select materials and colors to blend with the surroundings.

11. Above ground facilities will be painted to blend with natural surroundings (where not precluded by safety regulations) to minimize visual intrusion.

12. Views down the ROW will be minimized by breaking long, straight lines of pipe with ROW angles.

13. Native vegetation will be planted at road, trail, and key visual viewpoints to break the view of the ROW and blend with natural landscape.

RECREATION

1. Temporary access will be made available for any major campgrounds or trails blocked by construction.

TRANSPORTATION

1. Boring techniques will be used under major or busy roadways to avoid disrupting traffic.

2. During temporary shut-down, ROW shall be blocked to avoid unauthorized entry.

3. Adequate safety precautions and traffic control (detours, flagmen) will be provided for traffic safety in accordance with Federal, state, or county requirements.

4. Any disturbed local roadways will be repaired or replaced to maintain transportation network.

5. All public and private roadway crossings and access points will be restored to safe and acceptable conditions.

6. Minor road crossings will be completed in 24 hours or less to minimize traffic disruption.

7. Access to existing Western Area Power Administration utility lines will not be blocked.

8. Construction activities on Western Area Power Administration's transmission access system shall allow heavy equipment to use the road at least to a standard of H-20 loading. This shall be achieved without increasing the elevation of the road surface in such a manner that would cause high centering of maintenance vehicles.

9. TransColorado will participate in the maintenance of roads used to access the ROW ancillary facilities in conjunction with other facilities.

10. On USFS roads, a maximum 1-inch rut will be allowed on existing aggregate surfaced roads or roads that require aggregate surfacing prior to use by TransColorado for pipeline construction. Contamination of the existing aggregate base or surfacing will not be allowed. No damage will be allowed on paved roads. On BLM and USFS native surfaced roads and roads identified for surfacing by TransColorado, the amount of permissible rutting will be determined on a site-specific basis by the Authorized Officer. Temporary shutdown may be required during periods of wet weather. Road maintenance equipment such as backhoes, graders, and dozers will be available to immediately repair rutting as soon as ground conditions permit. Criteria for deterring permissible rutting include: minimal long term damager to the road surface, minimal off-site soil movement or sedimentation from the road surface, and continued passage of all types of traffic without increased risk to public safety. No blading of materials off the road running surface, such as into adjacent vegetation or trees, or over fill slopes will be allowed. Any damage to the roads or appurtenances that may impair public safety shall be repaired immediately. All roads and appurtenances shall be returned to their original condition, or better, upon completion of the project operation in the area

LAND USE, ZONING, AND LOCAL COMMUNITIES

1. TransColorado shall abide by the valid existing rights of all permittees, licensees, ROW holders, leases, mining claimants, and any other holders of valid authorizations on BLM and USFS lands.

2. Pre-construction meetings will be conducted with the BLM, USFS, and FERC prior to beginning construction.

3. All necessary Federal, state, and local permits will be obtained.

4. The boundaries of the 75-foot construction ROW will be flagged prior to construction.

5. All existing improvements, such as fences, gates, irrigation ditches, and cattle guards, will be maintained and repaired to at least pre-construction condition to minimize disturbances to the public.

6. Measures will be provided to control use of ROW (natural barriers, gates, or tree planting) and prevent unauthorized travel for the life of the project.

PUBLIC HEALTH AND SAFETY

1. A fire prevention and suppression plan will be prepared and followed to avoid fire and maintain public safety.

2. Spark arrestors will be used during construction, operation, and maintenance to prevent fires.

3. Coordination with affected utilities will be done to avoid utility disruptions.

4. Safety measures will be provided to protect workers and the public from electric shocks. Hazards associated with work activities in the vicinity of high voltage electric power transmission lines will be identified and avoided.

5. An emergency response plan will be prepared and followed for leaks and spills (hazard areas, wetlands, stream crossings) to protect the public.

6. Pipeline construction will cease by sunset, night-time construction will not be permitted.

7. TransColorado will comply with all applicable Federal, state, and local laws and regulations concerning the use, storage, and control of designated hazardous materials.

8. TransColorado will comply with all applicable Federal, state, and local laws and regulations concerning the use, storage, and handling of explosive materials.

ATTACHMENT 2

REVISED TABLE 2-13

TransColorado Gas Transmission Project
Site-Specific Environmental Protection Measures

This table lists BLM and USFS site-specific environmental protection measures that will be attached to the BLM ROW grant in addition to those listed in Revised Table 2-12. These measures are based upon decisions in BLM and USFS land use plans. As dictated by these plans and agency policies, exceptions to the listed stipulations are permitted by waivers or modifications and must be in writing and signed by both the affected land manager and the authorized officer for the project. The Federal agency that administers the Federal land would prepare site-specific environmental analysis documents prior to waiving any exceptions. The measure that is shaded in this table is the revised measure from Table 2-6 of the 1998 Supplement to the 1992 TransColorado Final EIS (SFIES).

Stipulation	Exception
Paleontological Resources Stipulation	
Paleontological surveys shall be conducted within the 75-foot right-of-way where it intersects BLM/FS Class I paleontological areas. The surveys shall be conducted by a qualified paleontologist prior to pipeline construction. Any significant fossils found during the surveys will be avoided or excavated as instructed by the applicable BLM/USFS office.	
Soils and Water Stipulations	
Surface-disturbing activities shall be prohibited within 100 feet of perennial streams in the Grand Junction Resource Area (Grand Junction Resource Management Plan).	Does not apply to essential utility crossings
The ROW to be cleared for construction in the Palisade municipal watershed would be limited to a mutually agreed-upon width based on a site-specific plan to be included in the Final Grand Mesa Slopes Plan of Development. The plan concepts are to narrow the construction width to approximately 65 feet where the pipeline would parallel an existing access road, and the blading would be narrowed to less than 75 feet in gently sloping areas where topsoil, spoil, and cleared vegetation storage needs do not impair safety and construction efficiency. In areas of difficult construction within the Palisade watershed (steep slopes, sideslopes, stream crossings, rocky areas) the temporary use areas listed in Appendix C-3 of the Final SFEIS would be cleared of vegetation and graded as necessary to	

ATTACHMENT 2

REVISED TABLE 2-13

TransColorado Gas Transmission Project
Site-Specific Environmental Protection Measures

Stipulation	Exception
provide work space and storage areas within the dimensions (length, width) described. Figures 2-2 and 2-3 illustrates the segments of the pipeline alignment within the Palisade watershed and adjacent construction areas on Grand Mesa where ROW disturbance would be narrowed in accordance with construction concepts outlined above	
Surface occupancy shall be prohibited on slopes greater than 40 percent. Other surface-disturbing activities shall be allowed only after analyzing site-specific conditions and potential for safety hazards and reclamation (Grand Junction Resource Management Plan).	Waivers or modifications permitted if TransColorado agrees to the following measures to protect soils, water, and vegetation resources on these steep slopes. Additional measures may be added as needed during siting of the pipeline: a. Prior to any grading and trenching in these areas, a temporary retaining barrier consisting of a woven mesh-type material will be installed at the edge of the defined ROW to hold the spoil material on the slope. Grading and trenching will be accomplished using smaller earth-moving equipment and backhoes. Trench breakers will be used to minimize soil erosion. b. After the ROW has been restored to a condition acceptable to BLM, waterbars will be constructed to: (1) ensure that soil erosion is minimized; (2) simulate the imaginary contour lines of the slope (ideally with a grade of 1 to 2 percent); (3) drain away from the disturbed area; and (4) begin and end in vegetation or rock where possible. A closer spacing of waterbars may be required on steep slopes to reduce channelization. Waterbars will be installed according to the following table: Slope (%) — Spacing Interval (feet) 0-2 — 120 2-5 — 100 5-10 — 75 10-20 — 50 >20 — 30

ATTACHMENT 2

REVISED TABLE 2-13

TransColorado Gas Transmission Project
Site-Specific Environmental Protection Measures

Stipulation	Exception
	c. When appropriate, slash will also be used to control erosion. Silt and runoff retention basins may be constructed along the ROW to reduce erosion. The BLM will approve site locations and develop minimum standards for the basins. d. Areas disturbed either indirectly by passage of construction equipment or directly by trenching and backfilling will be seeded with a BLM approved mixture. Seeding will be done during the months of September through November. If seeding is not accomplished until the following year, all annuals and undesirable vegetation (Russian thistle, Halogeton, etc.) will be eradicated prior to seeding. The seeds will be planted using a drill equipped with a depth regulator to ensure proper depth. Where drilling is not possible, seed will be broadcast and the area will be chained to cover the seed. When broadcasting the seed, the pounds of pure live seed/acre will be doubled. e. After the ROW has been restored and seeding has been completed, an approved matting will be installed to stabilize the soil. This matting will only be necessary on very steep slopes selected by the BLM.
Surface-disturbing activities will be prohibited on highly erodible soils from March 1 to May 31 to minimize erosion and salt yields during periods of high soil moisture (Uncompahgre Basin Resource Management Plan).	May be waived or modified if soil conditions permit construction without creating ruts greater than 4 inches in depth.
No long-term adverse impacts on public lands will be allowed to riparian/aquatic systems of Cottonwood and Roubideau Creeks (Uncompahgre Basin Resource Management Plan). Removal of all trees and shrubs in the riparian areas of Cottonwood and Roubideau Creeks shall be prohibited.	May be waived or modified if TransColorado can demonstrate that removal of trees and shrubs in the riparian areas would not result in long-term impacts to the riparian/aquatic systems of Cottonwood and Roubideau Creeks. In addition, any trees or shrubs approved for removal shall be replaced with willow clumps or cottonwoods from nursery stock or some source other than adjacent BLM land. Plants shall be protected from livestock and wildlife.

ATTACHMENT 2

REVISED TABLE 2-13

TransColorado Gas Transmission Project
Site-Specific Environmental Protection Measures

Stipulation	Exception
Wildlife Stipulations	
Disturbing activities shall be prohibited in key, (severe winter range, crucial range, winter concentration areas, fawning areas, calving areas, sage grouse leks, heron rookeries, raptor nests) ranges and nesting areas (Tables 2-15 and 2-16) during the times listed below. These dates are based on the most conservative agency recommendations for areas crossed by the TransColorado Project. Recommended dates vary between BLM Resource Areas, National Forests, and state wildlife agencies. Key Winter Range Mule Deer 12/1-5/1 Elk 12/1-5/1 Antelope 12/1-5/1 Fawning, Calving Areas - Mule Deer 5/15-7/1 Elk 5/1-7/1 Antelope 5/1-7/1 Sage Grouse Nesting/Breeding Areas - No activity within 2 miles of an active sage grouse lek between 3/1-7/15 Nesting Waterfowl Areas - 3/15-6/30 Heron Rookeries - No activity within 0.5 miles between 3/15-7/31 Ferruginous Hawk - no activity within 1 mile of the nest between 2/1-8/15 Golden Eagle - no activity within 0.5 miles of the nest between 2/1-8/15	May be waived or modified if TransColorado can demonstrate that disturbing activities during seasonal closures could be conducted without causing unacceptable impacts to wintering animals, big game calving/fawning areas, nesting/breeding sage grouse, nesting heron, and nesting raptors.

ATTACHMENT 2

REVISED TABLE 2-13

TransColorado Gas Transmission Project
Site-Specific Environmental Protection Measures

Stipulation	Exception
Other Raptor Nests - no activity within 0.5 miles of the nest between 2/1-8/15 (no stipulations cover the American kestrel), the dates and distances vary according to raptor species.	
Major utility corridors are excluded in key big game areas (see Tables 2-15 and 2-16) in the San Juan, San Miguel Resource Areas, to protect wintering big game habitat.	Exceptions may be authorized on a case-by-case basis depending on the site-specific impact of the proposal (San Juan/San Miguel Resource Management Plan). May be waived or modified if TransColorado can demonstrate that pipeline construction could be conducted without causing unacceptable impacts to wintering big game habitat. In addition, TransColorado must agree to re-establish sagebrush, fourwing saltbush, or other appropriate shrubs for winter forage.

ATTACHMENT 2

REVISED TABLE 2-13

TransColorado Gas Transmission Project
Site-Specific Environmental Protection Measures

Stipulation	Exception
Threatened and Endangered Species Stipulations	
Disturbing activities shall be prohibited in key habitats for threatened and endangered species during the following periods and within the following buffer zones. TransColorado shall not remove or damage any known bald eagle roost trees. In addition, TransColorado shall minimize the removal of all large trees and snags in bald eagle winter use areas. When selecting trees for removal, the following types of trees and snags should be avoided: 1) large conifers, or groups of conifers, which are significantly taller than the adjacent trees, particularly if the trees have open branch structure or dead tops; 2) snags, or groups of snags, which are significantly larger than the surrounding trees; 3) cottonwoods or snags that stand in open mostly treeless areas, such as Disappointment Valley; and 4) large cottonwoods in streamside areas that are significantly taller than surrounding cottonwoods. Recommended avoidance periods and buffer zones vary between BLM Resource Areas, National Forests, and state wildlife agencies. The following buffer zone recommendations are from USFWS bald eagle (USFWS 1982) and peregrine falcon (USFWS 1984) recovery plans and USFS (USFS 1991B) Region 3 Mexican Spotted Owl Guidelines. The following avoidance periods are based on the most liberal agency recommendations for key habitats crossed by the TransColorado project. Bald Eagle Nesting site - no activity within 0.5 miles of the nest between 11/15-7/31. Winter roost - no activity within 0.25 mile of the roost between 11/15-4/15. Winter concentration areas no activity within 0.25 mile of the winter concentration area between 12/1-4/15.	May be waived or modified if TransColorado can demonstrate that pipeline construction could be conducted without causing unacceptable impacts to threatened or endangered species.

ATTACHMENT 2

REVISED TABLE 2-13

TransColorado Gas Transmission Project
Site-Specific Environmental Protection Measures

Stipulation	Exception
Peregrine Falcon Nesting site - no activity within 1 mile of the nest between 3/15-7/31.	
Mexican Spotted Owl - Establish a 450 acre core area and a 2,000 acre territory around any Mexican spotted owl nest. Restrict activities within core area. If it is not legally possible to restrict activities, no activities will be permitted within the core area between 2/1-7/31. Disturb no more than 516 acres of the 2,000 acre territory.	
Cultural Resources TransColorado shall conduct a Class III cultural resources inventory within a 200-foot corridor along the approved pipeline route prior to the BLM and USFS making a decision. The inventory shall be conducted on public and private lands by a Federally-approved archaeologist in accordance with the Programmatic Agreement signed by the BLM, ACHP, USFS, alignment within the Palisade watershed and adjacent construction areas on Grand Mesa where ROW disturbance would be narrowed in accordance with construction concepts outlined above.	
Travel Restrictions: Areas listed on Table 2-17 are closed yearlong to off-road or off-trail motorized vehicle travel to prevent erosion and area use conflicts (San Juan National Forest Land and Resource Management Plan).	May be waived or modified if TransColorado can demonstrate that pipeline construction could be conducted without causing unacceptable impacts. This stipulation shall not be waived for scheduled maintenance.
Areas listed on Table 2-17 are closed to motorized vehicles from December 1 to March 31 yearly to protect wildlife winter range (San Juan National Forest Land and Resource Management Plan).	May be waived or modified if TransColorado can demonstrate that pipeline construction could be conducted without causing unacceptable impacts to wildlife winter range. This stipulation shall not be waived for scheduled maintenance.

ATTACHMENT 2

REVISED TABLE 2-13

TransColorado Gas Transmission Project
Site-Specific Environmental Protection Measures

Stipulation	Exception
Roads listed on Table 2-17 are closed to motorized vehicles from November 1 to June 30 yearly to prevent road damage (Grand Mesa, Uncompahgre, and Gunnison National Forests Land and Resource Management Plan).	May be waived or modified if TransColorado can demonstrate that pipeline construction could be conducted without causing unacceptable impacts to roads. This stipulation shall not be waived for scheduled maintenance.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Mountain-Prairie Region

IN REPLY REFER TO:
ES/BLM
GJ-6-CO-98-F-007
CO/KS/NE/UT

MAILING ADDRESS:
Post Office Box 25486
Denver Federal Center
Denver, Colorado 80225-0486

STREET LOCATION:
134 Union Blvd.
Lakewood, Colorado 80228-1807

MAY 18 1998

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SUPPORT SERV			

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MAY 21 1998
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SAN JUAN			
AMC			
FILE			

Memorandum

To: State Director, Bureau of Land Management, Lakewood, Colorado
Attention: District Manager, Montrose, Colorado

From: Regional Director, Region 6, U.S. Fish and Wildlife Service, Denver, Colorado

Subject: Final Biological Opinion for the TransColorado Gas Transmission Line Project

In accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.), and the Interagency Cooperation Regulations (50 CFR 402), this transmits the Fish and Wildlife Service's final biological opinion for impacts to federally listed endangered species for the TransColorado Gas Transmission Line Project. Copies of this opinion should be provided to the applicant because the Service has incorporated reasonable and prudent alternatives that should be included as conditions of any permits issued by the Bureau of Land Management for this project.

This biological opinion has been reviewed by and prepared in cooperation with our Albuquerque, New Mexico, Ecological Services Office in Region 2 of the Fish and Wildlife Service. Coordination with the New Mexico Field Office was necessary due to water depletions and potential water contamination in the San Juan River Basin and due to potential impacts to bald eagles Haliaeetus leucocephalus along the La Plata River in New Mexico. While the actual water depletions occur in Montezuma and La Plata County, Colorado, the associated impact to endangered fishes occurs in the San Juan River in southwest Colorado, New Mexico, and Utah. The San Juan River is covered under the "Recovery Implementation Program for the San Juan River" (U.S. Fish and Wildlife Service 1992) for which Region 2 has the lead. This biological opinion is consistent with the Program agreements administered by Region 2.

Reference is made to your January 12, 1998, correspondence requesting initiation of formal consultation for the subject project. The Service concurs that the annual depletion of water from the Colorado River Basin "may affect" the endangered Colorado squawfish (Ptychocheilus lucius), humpback chub (Gila cypha), bonytail (Gila elegans), and razorback sucker (Xyrauchen texanus) and the water depletion and alteration of habitat from pipeline construction "may affect" their critical habitat. The Service concurs that the proposed project "may affect" the Colorado squawfish and razorback sucker and result in the destruction or adverse modification of their critical habitat in the San Juan River Basin. The Service also concurs that the project "may affect" the bald eagle, peregrine falcon (Falco peregrinus), Mexican spotted owl (Strix occidentalis lucida), southwestern willow flycatcher (Empidonax traillii extimus), and Sclerocactus glaucus (Uinta Basin hookless cactus).

BIOLOGICAL OPINION

Based upon the best scientific and commercial information that is currently available, it is the Service's biological opinion that the proposed project, as described below, is likely to jeopardize the continued existence of the Colorado squawfish, humpback chub, bonytail, and razorback sucker and result in the destruction or adverse modification of their critical habitat in the Upper Colorado River Basin. It is also the Service's biological opinion that the proposed project is likely to jeopardize the continued existence of the Colorado squawfish and razorback sucker and result in the destruction or adverse modification of their critical habitat in the San Juan River Basin. Furthermore, it is the Service's biological opinion that the project is not likely to jeopardize the continued existence of the bald eagle, peregrine falcon, Mexican spotted owl, southwestern willow flycatcher, or Uinta Basin hookless cactus. The Service has developed reasonable and prudent alternatives to avoid the likelihood of jeopardy to the endangered fishes and to avoid destruction or adverse modification of their critical habitat. The Service has developed conservation recommendations for the bald eagle, peregrine falcon, Mexican spotted owl, southwestern willow flycatcher, and Uinta Basin hookless cactus.

PROJECT DESCRIPTION

The TransColorado Gas Transmission Company plans to construct, operate, and maintain a 272-mile natural gas pipeline. The line will consist of 255 miles of 22-inch diameter pipe and 17 miles of 24-inch diameter pipe. The completed project would extend from the Piceance Basin near Meeker, Colorado to an existing gas processing facility near Bloomfield, New Mexico. About 10 miles

of the pipeline is in San Juan County New Mexico with the other 262 miles in Colorado. The construction right-of-way will be 75 feet wide and the permanent ROW will be 50 feet wide. Total land disturbance will be about 3,231 acres.

TransColorado currently plans to construct a compressor station on a 5-acre site west of Olathe in Montrose County near MP 120 and a second compressor station north of the Dolores River near MP 220. Mainline block valves will be located at approximately 20-mile intervals within a small fenced area inside the permanent pipeline ROW. Interconnections and metering stations typically occupy a site of 0.25 acre or less and are fenced.

Temporary use areas are locations along the pipeline where additional space would be required beyond the 75-foot construction ROW. These areas are needed to stage construction for crossings of streams and wetlands; side-slope cuts where material would be sidecast; road crossings; rock and debris piles; and other uses. In most cases, TUAs would be located immediately adjacent to the ROW but occasionally; however, space would be needed on both sides of the ROW. TUAs may be contiguous to each other; however, each space would be assigned a designated function and would be set aside for the assigned purpose. Most work spaces would extend less than 100 feet from the approved centerline, but some larger areas needed for staging and temporary storage may be larger. More than 500 separate TUAs have been identified in conjunction with the construction-planning review. Total additional disturbance area associated with TUAs that extend beyond the construction is estimated to be less than 400 acres.

Existing roads would be used to transport materials and personnel to the ROW. Some existing roads would require upgrading to allow passage of heavy equipment. Any new temporary roadways would be regraded and reseeded in accordance with the Project Reclamation Plan.

Vegetation would be cleared and the construction ROW graded to provide for safe and efficient operation of construction equipment and to provide space for the storage of subsoil and topsoil. Topsoil would be stripped only over the ditch and spoil area, where necessary. Once grading has been performed, TransColorado will implement temporary measures, such as waterbars and sediment barriers to control erosion and minimize sedimentation.

Construction methods used to excavate a trench would vary, depending on soils, terrain, and related factors. Where possible, self-propelled trenching machines will be used. In situations such as steep slopes, unstable soils, high water table, or deep or wide trench requirements, conventional mechanical

track-type backhoes usually will be used. Where rock is encountered, tractor-mounted mechanical rippers or rock-trenching equipment may be used to facilitate excavation. In areas where rippers or trenchers are not practical or sufficient, blasting may be employed. Blasting will be used only where necessary.

The ditch will typically be 36 inches wide at the bottom and 60 to 78 inches deep; however, it will vary with the conditions encountered. Occasionally, the ditch will be excavated to depths greater than the values specified above. For instance, the ditch will generally be excavated to greater depths to pass under all unpaved road crossings, streams, or other obstructions.

CONSULTATION HISTORY

On January 25, 1990, TransColorado filed a ROW application to construct, operate, and maintain a natural gas pipeline on Bureau of Land Management and U.S. Forest Service administered lands in western Colorado and northwestern New Mexico. The Bureau of Land Management is the lead Federal agency for the Project, with the U.S. Forest Service acting as a cooperating agency.

The entire pipeline route and compressor stations were reviewed and approved under the National Environmental Policy Act during 1991 and 1992. The Agency-Preferred Alternative pipeline route identified in the Final Environmental Impact Statement issued in July of 1992 was approved in Records of Decision issued by the Bureau of Land Management and U.S. Forest Service in December of 1992. The Federal Energy Regulatory Commission issued its Certificate for the Project on June 3, 1994. A Biological Assessment was prepared for the Project under the supervision of the Bureau of Land Management and filed with the U.S. Fish and Wildlife Service in September 1992. The Service issued a Draft Biological Opinion that was included in the Final EIS; the Service then issued a Final Opinion (FWS/GJ-6-CO-92-F-010) on November 30, 1992, that was attached to the ROD cited above.

In 1996, TransColorado proposed to construct Phase I of the Project. The pipeline route for Phase I is in a different location from that approved in the 1992 ROD. Consequently, Phase I facilities were analyzed in a Supplemental Environmental Assessment and a Bureau of Land Management ROD dated July 30, 1996. This project consisted of a 22.5-mile section of 24-inch-diameter pipeline, from the Blanco Plant located approximately 2 miles north of Bloomfield, New Mexico to the vicinity of the Coyote Gulch Gas Plant on the Southern Ute Reservation just north of Colorado-New Mexico state border. The Phase I mainline pipeline is connected to the Coyote Gulch Treating Plant by a 2.5-mile lateral pipeline. A Plan of Development and an

Assessment were prepared concurrently with the Phase I EA. The project under consideration in this Opinion is considered Phase II.

BASIS FOR BIOLOGICAL OPINION

This biological opinion addresses an average annual depletion of approximately 124 acre-feet from the Upper Colorado River Basin and 21 acre-feet from the San Juan River Basin. Water depletions in the Upper Colorado and San Juan River Basins have been recognized as a major source of impact to endangered fish species. Continued water withdrawal has restricted the ability of the Colorado and San Juan River systems to produce flow conditions required by various life stages of the fishes. This opinion also addresses impacts to critical habitat that will be effected by pipeline construction.

Listed Fishes

Critical habitat has been designated for the Colorado squawfish, bonytail, humpback chub, and razorback sucker within the 100-year floodplain in portions of their historic range (59 F.R. 13374). Destruction or adverse modification of critical habitat is defined in 50 CFR 402.02 as a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of listed species. In considering the biological basis for designating critical habitat, the Service focused on the primary physical and biological elements that are essential to the conservation of the species without consideration of land or water ownership or management. The Service has identified water, physical habitat, and biological environment as the primary constituent elements. This includes a quantity of water of sufficient quality that is delivered to a specific location in accordance with a hydrologic regime that is required for the particular life stage for each species. Water depletions reduce the ability of the river system to provide the required water quantity and hydrologic regime necessary for recovery of the fishes. The physical habitat includes areas of the Colorado River system and the San Juan River system (below Farmington, New Mexico) that are inhabited or potentially habitable for use in spawning and feeding, as a nursery, or serve as corridors between these areas. In addition, oxbows, backwaters, and other areas in the 100-year floodplain, when inundated, provide access to spawning, feeding, and nursery habitats. Water depletions reduce the ability of the river to create and maintain these important habitats. Food supply, predation, and competition are important elements of the biological environment. Food supply is a function of nutrient supply and productivity, which could be limited by reduction of high spring flows brought about by water depletions. Predation and competition from nonnative fish species has been identified as a factor in the decline of the endangered

fishes. Water depletions contribute to alterations in flow regimes that favor nonnative fishes. The Service concludes that water depletions impact the primary constituent elements and cause destruction or adverse modification to critical habitat.

Bald Eagle

The proposed pipeline route will cross several rivers that contain habitat for the bald eagle. In January and February 1998 there were two winter communal roost sites and one winter concentration area discovered on the La Plata River in Colorado and New Mexico that may be impacted by pipeline construction and maintenance activities (ENSR 1998). There is also a winter concentration area ending about 1 and ½ miles upstream of the San Miguel River crossing and the area around the Colorado River crossing is considered to be within a winter concentration area.

Peregrine Falcon

Though no peregrine falcon nests are currently known within 1 mile of the proposed Project (Bureau of Land Management 1998), there may be nesting peregrine falcons at Naturita Canyon, San Miguel River Canyon, and other canyon crossings.

Mexican Spotted Owl

In 1992, there were two unconfirmed vocalizations of Mexican spotted owls at Cherry Creek (Devil's Canyon) and in the Dolores Canyon. Suitable habitat was determined to be present at several locations and, in 1997, 14 priority locations were surveyed. No vocalizations or visual observations were recorded (Bureau of Land Management 1998). However, it is possible that owls present did not respond to calls in 1997 and that owls could have moved into canyon habitats crossed by the pipeline since the 1997 surveys.

Southwestern Willow Flycatcher

There have been approximately 60 suitable habitat sites identified within the pipeline ROW (Bureau of Land Management 1998). Occupied sites occur near the pipeline at the Plateau Creek crossing near Mesa, Colorado and the Gunnison River crossing west of Delta, Colorado.

Uinta Basin Hookless Cactus

During surveys in 1991 and 1992 there were five populations of Uinta Basin hookless cactus found near the pipeline ROW. Three of these populations were bypassed by route alterations but two populations at mileposts 47.25 and 86 remained in the ROW. Fifteen individuals were in the population at milepost 47.25 which occurred on an alluvial plain of the Colorado River. The second population at milepost 86 consisted of 73 individuals in the Gunnison River population. The 88 individuals affected comprised 0.4 percent of the total documented population of the species, 0.73 percent of the Colorado population, 0.38 percent of the Upper Colorado River population, and 0.91 percent of the Gunnison River population. Recent surveys have not yet been conducted; however, the route is similar to that proposed in 1992 and it is expected that approximately the same number of cactus will be impacted by the pipeline.

BIOLOGICAL BACKGROUND

Colorado Squawfish

The Colorado squawfish evolved as the main predator in the Colorado River system. The diet of Colorado squawfish longer than 3 or 4 inches consists almost entirely of other fishes (Vanicek and Kramer 1969). The Colorado squawfish is the largest cyprinid fish (minnow family) native to North America and, during predevelopment times, may have grown as large as 6 feet in length and weighed nearly 100 pounds (Behnke and Benson 1983). These large fish may have been 25-50 years of age.

Based on early fish collection records, archaeological finds, and other observations, the Colorado squawfish was once found throughout warmwater reaches of the entire Colorado River Basin, including reaches of the upper Colorado River and its major tributaries, the upper San Juan River and possibly its major tributaries, the Green River and its major tributaries, and the Gila River system in Arizona (Seethaler 1978). Colorado squawfish were apparently never found in colder, headwater areas. Seethaler (1978) indicates that the species was abundant in suitable habitat throughout the entire Colorado River basin prior to the 1850's. Historically, Colorado squawfish have been collected in the upper Colorado River as far upstream as Parachute Creek, Colorado (Kidd 1977). Platania and Young (1989) summarized historic fish collections in the San Juan River drainage which indicate that Colorado squawfish once inhabited reaches above what is now the Navajo Dam and Reservoir near Rosa, New Mexico. Since closure of the dam in 1962 and the accompanying fish eradication program, physical changes (flow and temperature) associated with operation of the Navajo Project have eliminated Colorado

squawfish in the upper San Juan River, both from the reservoir basin as well as from several miles of river downstream of the dam.

A marked decline in Colorado squawfish populations can be closely correlated with the construction of dams and reservoirs between the 1930's and the 1960's, introduction of nonnative fishes, and removal of water from the Colorado River system. Behnke and Benson (1983) summarized the decline of the natural ecosystem. They pointed out that dams, impoundments, and water use practices are probably the major reasons for drastically modified natural river flows and channel characteristics in the Colorado River Basin. Dams on the main stem have essentially segmented the river system, blocking Colorado squawfish spawning migrations and drastically changing river characteristics, especially flows and temperatures. In addition, major changes in species composition have occurred due to the introduction of nonnative fishes, many of which have thrived as a result of changes in the natural riverine system (i.e., flow and temperature regimes). The decline of endemic Colorado River fishes seems to be at least partially related to competition or other behavioral interactions with nonnative species, which have perhaps been exacerbated by alterations in the natural fluvial environment.

In 1963, the Navajo Dam was closed, and Navajo Reservoir began to fill with water from the San Juan River. Historically, flows in the San Juan River prior to the Navajo Dam were highly variable and ranged from a low of 44 cubic feet per second (cfs) in September 1956, to a high of 19,790 cfs in May 1941 (mean monthly values) at the U.S. Geological Survey Station 93680000, Shiprock, New Mexico. Conversely, post-Navajo Dam flows in the San Juan River have ranged from a low of 185 cfs in July 1963, while the reservoir was filling, to a high of 9,508 cfs in June 1979.

According to the Bureau of Reclamation, since 1963, Navajo Dam has significantly altered flow of the San Juan River by typically storing spring peak flows and releasing water in summer, fall, and winter months resulting in an average decrease in spring peak flows of 45 percent, while approximately doubling winter base flows at the Bluff gauge in Utah. Similar comparisons can be made at the upstream gauges at Shiprock and Farmington, New Mexico. Significant depletions and redistribution of flows of the San Juan River also have occurred as a result of other major water development projects, including Navajo Indian Irrigation Project and the San Juan-Chama Project. These depletions, along with a number of other factors, have resulted in such drastic reductions in the populations of Colorado squawfish and razorback sucker throughout their ranges that the Service has listed these species as endangered and has implemented programs to prevent them from becoming extinct.

The Colorado squawfish currently occupies about 1,030 river miles in the Colorado River system (25 percent of its original range) and is presently found only in the Upper Basin above Glen Canyon Dam. It inhabits about 350 miles of the main stem Green River from its mouth to the mouth of the Yampa River. Its range also extends 160 miles up the Yampa River and 104 miles up the White River, the two major tributaries of the Green River. In the main stem Colorado River, it is currently found from Lake Powell extending about 201 miles upstream to Palisade, Colorado (Tyus et al. 1982), and in the lower 60 miles of the Gunnison River, a tributary to the main stem Colorado River (Burdick pers. comm. 1995).

The San Juan River currently flows approximately 225 river miles from the Navajo Dam downstream to Lake Powell. The reach of currently known occupied Colorado squawfish habitat extends from Lake Powell upstream to river mile 158.4 and could be significantly impacted due to upstream water withdrawals. Of the 225 miles, about 159 of those are potentially available to the Colorado squawfish. Two diversion structures near Fruitland, New Mexico (the Hogback at river mile 158.6 and the weir at river mile 166.2), span the entire river channel and are believed to be effective blocks to upstream fish migrations (Platania 1990). The Hogback is often breached during high water which may allow passage at certain water levels, however, after breaching, the structure is rebuilt and is a block to upstream fish movement.

As the southernmost tributary of the Upper Colorado River Basin, the San Juan River peaks earlier in the year and attains warmer water temperatures than other Upper Basin streams and is conducive to longer and better growth potential for young Colorado squawfish. Any additional large loss of water or further degradation of remaining habitats of the San Juan River will exacerbate problems the Colorado squawfish is currently experiencing in the San Juan and other subbasins throughout the Upper Basin.

The San Juan River is one of only three remaining areas where a wild, reproducing population of Colorado squawfish still persists. The San Juan River subbasin, isolated from the Colorado and Green River subbasins, provides a third population of wild fish, contributing an additional essential buffer against a catastrophic event (such as an oil spill) elsewhere in the basin. While the Colorado squawfish population may be small in the San Juan River, it may be important as unique genetic stock. Because of this the Colorado River Fishes Recovery Team (consisting of scientists from the entire Colorado River Basin, including representatives from State wildlife agencies of California, Arizona, New Mexico, Utah, and Colorado, as well as Federal representatives from the National Park Service, Reclamation, and the Service) recommended that

the San Juan River be added to the Colorado squawfish recovery plan. The updated Colorado Squawfish Recovery Plan (August 6, 1991) states that the species can be downlisted to threatened when all recovery areas (including the San Juan River from Lake Powell upstream to the confluence of the Animas River) have naturally self-sustaining populations. The San Juan River is also included in the delisting criteria.

Critical Habitat

Critical habitat has been designated within the 100-year floodplain of the Colorado squawfish's historical range in the following sections of the Upper Basin (59 F.R. 13374).

Colorado, Moffat County. The Yampa River and its 100-year floodplain from the State Highway 394 bridge in T. 6 N., R. 91 W., section 1 (6th Principal Meridian) to the confluence with the Green River in T. 7 N., R. 103 W., section 28 (6th Principal Meridian).

Utah, Uintah, Carbon, Grand, Emery, Wayne, and San Juan Counties; and Colorado, Moffat County. The Green River and its 100-year floodplain from the confluence with the Yampa River in T. 7 N., R. 103 W., section 28 (6th Principal Meridian) to the confluence with the Colorado River in T. 30 S., R. 19 E., section 7 (Salt Lake Meridian).

Colorado, Rio Blanco County; and Utah, Uintah County. The White River and its 100-year floodplain from Rio Blanco Lake Dam in T. 1 N., R. 96 W., section 6 (6th Principal Meridian) to the confluence with the Green River in T. 9 S., R. 20 E., section 4 (Salt Lake Meridian).

Colorado, Delta and Mesa Counties. The Gunnison River and its 100-year floodplain from the confluence with the Uncompahgre River in T. 15 S., R. 96 W., section 11 (6th Principal Meridian) to the confluence with the Colorado River in T. 1 S., R. 1 W., section 22 (Ute Meridian).

Colorado, Mesa and Garfield Counties; and Utah, Grand, San Juan, Wayne, and Garfield Counties. The Colorado River and its 100-year floodplain from the Colorado River Bridge at exit 90 north off Interstate 70 in T. 6 S., R. 93 W., section 16 (6th Principal Meridian) to North Wash, including the Dirty Devil arm of Lake Powell up to the full pool elevation, in T. 33 S., R. 14 E., section 29 (Salt Lake Meridian).

New Mexico, San Juan County; and Utah, San Juan County. The San Juan River and its 100-year floodplain from the State Route 371 Bridge in

T. 29 N., R. 13 W., section 17 (New Mexico Meridian) to Neskahai Canyon in the San Juan arm of Lake Powell in T. 41 S., R. 11 E., section 26 (Salt Lake Meridian) up to the full pool elevation.

Biology

The life-history phases that appear to be most critical for the Colorado squawfish include spawning, egg fertilization, and development of larvae through the first year of life. These phases of Colorado squawfish development are tied closely to specific habitat requirements. Natural spawning of Colorado squawfish is initiated on the descending limb of the annual hydrograph as water temperatures approach 20 °C. Spawning, both in the hatchery and in the field, generally occurs in a 2-month timeframe between July 1 and September 1, although high flow water years may suppress river temperatures and extend spawning in the natural system into September. Conversely, during low flow years when the water warms earlier, spawning may occur in late June.

Temperature also has an effect on egg development and hatching. In the laboratory, egg mortality was 100 percent in a controlled test at 13 °C. At 16 °C to 18 °C, development of the egg is slightly retarded, but hatching success and survival of larvae was higher. At 20 °C to 26 °C, development and survival through the larval stage was up to 59 percent (Hamman 1981). Juvenile temperature preference tests showed that preferred temperatures ranged from 21.9 °C to 27.6 °C. The most preferred temperature for juveniles and adults was estimated to be 24.6 °C. Temperatures near 24 °C are also needed for optimal development and growth of young (Miller et al. 1982).

A natural hydrograph with a large spring peak; a gradually declining/descending limb into early summer; and low, stable flows through summer, fall, and winter are thought to create the best habitat conditions for endangered fishes while maintaining the integrity of the channel geomorphology. Tyus and Karp (1989) pointed out the importance of peak flows (spring runoff) associated with reproductive activities of Colorado squawfish. They further stated that alteration of this hydrological event may affect initiation of Colorado squawfish migration and spawning. Additionally, maintenance of low stable flows in summer and fall are necessary for growth and survival of young Colorado squawfish.

Most information on Colorado squawfish reproduction was gathered from spawning sites on the lower 20 miles of the Yampa River and in Gray Canyon on the Green River (Tyus et al. 1982; Tyus and McAda 1984; Tyus 1985; Wick et al 1985; Tyus 1990). Colorado squawfish spawn after the peak runoff season from June to

mid-August. Spawning begins when water temperatures reaches 18° to 25° C, and peak spawning activity occurs between 22° to 25° C (Haynes et al. 1984; Archer et al. 1985; Tyus 1990). During the decline in water level following peak runoff, spawning adult fish move into run-riffle areas and occupy run, eddy, and pool habitats (Tyus 1990). After spawning, adult Colorado squawfish utilized a variety of riverine habitats including eddies, backwaters, shorelines, and others (Tyus 1990).

Specific spawning sites of Colorado squawfish have not been identified outside of the Green River basin. However, spawning has been confirmed by the presence of larval squawfish in two reaches of the Colorado River; Black Rocks to Loma, and Grand Junction to Clifton (McAda and Kaeding 1991). The presence of larval squawfish aggregations and suitable spawning habitat in the Colorado River near Cataract Canyon, Professor Valley, and upstream from the Dolores River confluence indicate spawning is occurring in or near these areas as well (Archer et al. 1985; Valdez 1990).

Only two Colorado squawfish confirmed spawning sites, as defined in the Colorado Squawfish Recovery Plan, have been located in the Upper Basin: river mile 16.5 of the Yampa River and river mile 156.6 of the Green River. These areas have the common characteristics of coarse cobble or boulder substrates forming rapids or riffles associated with deeper pools or eddies. It is believed that a stable, clean substrate is necessary for spawning and incubation. Substrates are swept clean of finer sediments by high flows scouring the bed prior to the spawning period.

Data indicates that clean cobble substrates are necessary for spawning and incubation (Tyus and Karp 1989). Several studies on the cobble cleaning process have been conducted at a known spawning location in Yampa Canyon. O'Brien (1984) studied the hydraulic and sediment transport dynamics of the cobble bar within the Yampa River spawning site and duplicated some of its characteristics in a laboratory flume study. O'Brien (1984) concluded that incipient motion of the cobble bed is required to clean cobbles for spawning and estimated that this takes discharges of about 21,500 cfs. However, Harvey et al.(1993) concluded that since flows required for incipient motion of bed material are rare (20 year return period event) and spawning occurs annually, another process must be cleaning the cobbles. Their study found that in Yampa Canyon recessional flows routinely dissect gravel bars and thereby produce tertiary bars of clean cobble at the base of the riffles. These tertiary bars are used by Colorado squawfish for spawning. Harvey et al. (1993) recognizes the importance of high magnitude, low frequency discharges for the formation and maintenance of midchannel bars. Dissection of bars without redeposition

by high magnitude flows would lead to conditions where spawning habitat is no longer available (Harvey et al. 1993).

It is unknown whether tertiary bars used for Colorado squawfish spawning in Yampa Canyon are available in the 15-mile reach of the Colorado River. There, significant motion of bed material occurs at near bankfull discharge of 22,000 cfs (Van Steeter 1996). These flows occur on average once in 4 years. Van Steeter (1996) concludes that flows of this magnitude are important because they generally remove fine sediment from the gravel matrix which maintains the invertebrate community and cleans spawning substrate.

Although the location of spawning areas in the Colorado River is not well defined, the presence of larvae downstream of the Walker Wildlife Area, in the Loma to Black Rocks reach and near the confluence of the Dolores River, demonstrates that spawning does occur. Osmundson and Kaeding (1989 and 1991) reported that water temperatures in the Colorado River were suitable for spawning in the Grand Junction area. In 1986, a year of high runoff, suitable temperatures for spawning (20 °C) occurred in the first week of August. In 1989, a year of low runoff, the mean temperature reached 20 °C during the last week of June. Miller et al. (1982) and Archer et al. (1986) demonstrated that Colorado squawfish often migrate considerable distances to spawn in the Green and Yampa Rivers, and similar movement has been noted in the main stem Colorado River and San Juan River. A fish captured and tagged in the San Juan Arm of Lake Powell in April 1987, was later recaptured in the San Juan River approximately 80 miles upstream in September 1987 (Platania 1990).

Miller et al. (1982) concluded from collections of larvae and young-of-year below known spawning sites that there is a downstream drift of larval Colorado squawfish following hatching. Extensive studies in the Yampa and upper Green Rivers have demonstrated downstream distribution of young Colorado squawfish from known spawning areas (Archer et al. 1986; Haynes et al. 1985). Miller et al. (1982) also found that young-of-year Colorado squawfish, from late summer through fall, preferred natural backwater areas of zero velocity and less than 1.5-foot depth over a silt substrate. Juvenile Colorado squawfish habitat preferences are similar to that of young-of-year fish, but they appear to be mobile and more tolerant of lotic conditions away from the sheltered backwater environment.

Information on radio-tagged adult Colorado squawfish during fall suggests that fish seek out deepwater areas in the Colorado River (Miller et al. 1982), as do many other riverine species. River pools, runs, and other deep water areas, especially in upstream reaches, are important winter habitats for Colorado squawfish.

Extreme fluctuations occurring within the framework of a natural annual hydrograph may enhance spawning success of native species and inhibit exotic species. Haynes et al. (1984) reported that fish species, such as Colorado squawfish, that evolved under highly fluctuating flow conditions, were better able to survive and successfully recruit under those conditions than the introduced species. The decline of endemic Colorado River fishes seems to be partially related to competition or other behavioral interactions with nonnative species, which perhaps have been exacerbated by alterations in the natural fluvial environment. Valdez (1990) reported that densities of three nonnative cyprinids (red shiner, sand shiner, and fathead minnow) in the Colorado River were much lower following high-flow years and increased three to four times in a 2-year period during normal- and low-water years. Platania (1990) noted that, during the 3 years of studies on the San Juan River, spring flows and Colorado squawfish reproduction were highest in 1987. He further noted catch rates for channel catfish were lowest in 1987. Recent studies also found catch rates for young-of-year Colorado squawfish to be highest in high water years, such as 1993 (Buntjer et al. 1994, Lashmett 1994).

Very little information is available on the influence of turbidity on the endangered Colorado River fishes. It is assumed, however, that turbidity is important, particularly as it affects the interaction between introduced fishes and the endemic Colorado River fishes. Because these endemic fishes have evolved under natural conditions of high turbidity, it is concluded that the retention of these highly turbid conditions is an important factor for these endangered fishes. Reduction of turbidity may enable introduced species to gain a competitive edge which could further contribute to the decline of the endangered Colorado River fishes.

Colorado Squawfish Activity in the 15-mile Reach

The Grand Valley area is occupied year round by Colorado squawfish. The 15-mile reach is the section of river between the Grand Valley Diversion and the confluence with the Gunnison River. It has been identified as important habitat for Colorado squawfish.

Migration

Radio-telemetry studies show upstream and downstream movement of adult Colorado squawfish in the main stem Colorado River. The most dramatic movement was exhibited by a fish implanted with a radio transmitter at Gypsum Canyon in upper Lake Powell on April 5, 1982. The fish was contacted next in the lower Cataract Canyon area on July 9, 1982. The next contact was made

above the Black Rocks area of Ruby Canyon, some 160 miles upstream. The movement was accomplished in 41 days and is believed to be related to spawning. At the end of September 1982, this fish was located in the Colorado River in the vicinity of Clifton, Colorado (river mile 178), nearly 200 river miles from its furthest documented downstream location.

Other radio-tagged fish in the Colorado River have not displayed such dramatic migratory behavior. Radio-telemetry studies conducted by the Colorado River Fishery Project from 1982-1989 (Miller et al. 1982; Archer et al. 1986; Osmundson and Kaeding 1989), which focused on upstream reaches of the Colorado River in and around the Grand Valley, provide the best indication of use of the 15-mile reach above the confluence of the Gunnison River at one time or another during the field season. Movement of these fish during a field season was generally limited to 25-30 miles.

During 1986-1988, the Fishery Project radio telemetered 17 adult Colorado squawfish collected from the 15-mile reach above the Gunnison River in June (Osmundson and Kaeding 1989). The fish exhibited a diversity of localized movement throughout the Grand Valley but spent a major part of time in the 15-mile reach. Two remained in the reach throughout the estimated spawning period.

Spawning Activity

A suspected prespawning aggregation of adult Colorado squawfish was observed by Fishery Project personnel at river mile 178.3 in the 15-mile reach above the Gunnison River confluence in mid-July 1982. In the first observation, three radio-tagged fish were tracked to one riverine pool area, and nine adults at or near spawning condition were then captured there after limited net sampling efforts. The aggregation occurred a few days after mean daily water temperature had reached 20 °C and during a time when runoff flows were dropping off sharply. A second aggregation was noted at river mile 175.3, 12 days after the initial observation. Drifting trammel nets through an area occupied by two fish equipped with transmitters yielded an additional male Colorado squawfish in spawning condition. During this same time period, an adult female was captured near river mile 175 that weighed nearly 1 pound more than when previously captured a month earlier, suggesting the development of spawning (gravid) condition.

Larval Occurrence

Fishery Project studies included the routine sampling of the larval-fish community both within and downstream of the 15-mile reach. During 5 years

of investigation, 70 larval squawfish were collected with fine-mesh hand nets from the two Colorado River reaches in the Grand Valley immediately upstream and downstream of its confluence with the Gunnison River. Although the sampling effort was similar in the two river reaches, 96 percent of the larval captures occurred downstream of the Gunnison River confluence (river miles 162-164). Only two (3 percent) of the larvae were collected from the upstream reach. These observations may indicate that most fish were spawned in the downstream reach or that the larvae were deposited in the upstream reach and drifted downstream to the area where most of the captures were recorded.

Postlarval Young-of-Year Occurrence

No postlarval young-of-year Colorado squawfish greater than 25 mm total length were collected from above the Gunnison River confluence in a total of 57 samples collected in the fall of 1982-1986. However, a total of 62 Colorado squawfish were collected in an 18-mile reach below the confluence of the Gunnison River (54 samples). The 1982-1984 catch rate of young-of-year Colorado squawfish in the 10-mile reach immediately downstream of the confluence of the Gunnison River (river miles 160-170) warranted classification of this reach as a "Young-of-Year Nursery Area" by the Basin Biology Subcommittee (U.S. Fish and Wildlife Service 1984).

Nonspawning Adult Occurrence

Osmundson and Kaeding (1989) reported that adult Colorado squawfish catch rates in the upstream 15-mile reach were twice as high as those in the adjacent downstream river reach. During 1986-1989 adults were most abundant in a 1.3-mile segment (river miles 174.4-175.7) of the 15-mile reach during high water, particularly in two gravel-pit ponds that were accessible during high flows. These fish may have moved into these ponds to feed and rest, or they may have been attracted to the warm, productive environments that the ponds provided (pond temperatures were as much as 10.5 °C warmer than the adjacent river). Some of the squawfish captured from one pond were well tuberculated by June 3, when nearby river temperatures were only 10 °C-13 °C (Kaeding, pers. comm.). It has been hypothesized by some investigators that thermal energy units above those provided in the mainstream are important to gonadal maturation. If this is true, then access to these sheltered off-channel pools may be very important to successful spawning in the upper reaches of the Colorado River. Historically, bottomlands that routinely flooded during the spring runoff period would have provided these warm productive habitats; in recent years, flooded gravel pits may have provided the only comparable habitat.

Colorado Squawfish Activity: San Juan River

As a result of the biological opinion for the Animas-La Plata Project, Reclamation agreed to fund approximately 7 years of research on the San Juan River and its tributaries. While these studies are not yet complete, annual reports indicate that a small reproducing population of Colorado squawfish exists on the San Juan River. Based on radio telemetry studies and visual observations, two potential spawning areas have been located at river mile 132.0 and 131.15 (Miller 1994, Ryden and Pfeifer 1995a). Both of these sites are located in an area of the river known as the "Mixer" (river mile 133.4 to river mile 129.8). The highest concentration of adult Colorado squawfish in the San Juan River occur between the Cudei Diversion (river mile 142.0) and Four Corners (river mile 119.2). Ryden and Pfeifer (1995a) report that a Colorado squawfish captured at river mile 74.8 (between Bluff and Mexican Hat) made a 50-60 mile migration to the Mixer during the suspected spawning season in 1994. The fish then returned to within 0.4 river miles of its original capture location.

Successful reproduction was documented in the San Juan River in 1987, 1988, 1992, 1993, and 1994, by the collection of young-of-year Colorado squawfish. Majority of the young-of-year squawfish were collected in the San Juan River inflow to Lake Powell (Buntjer et al. 1994, Lashmett 1994, Platania 1990). Some young-of-year squawfish have been collected from the vicinity of the Mancos River confluence in New Mexico and in the vicinity of the Montezuma Creek confluence near Bluff, Utah, and at a drift station near Mexican Hat, Utah (Buntjer et al. 1994, Platania 1990). In 1994, a young-of-year squawfish was collected at the confluence with the Mancos River, which is the first specimen collected at this site since 1987 (Frank Pfeifer, USFWS, pers. comm.).

Razorback Sucker

The razorback sucker, an endemic species unique to the Colorado River Basin, was historically abundant and widely distributed within warmwater reaches throughout the Colorado River Basin. Historically, razorback suckers were found in the main stem Colorado River and major tributaries in Arizona, California, Colorado, Nevada, New Mexico, Utah, Wyoming, and in Mexico (Ellis 1914; Minckley 1983). Bestgen (1990) reported that this species was once so numerous that it was commonly used as food by early settlers and, further, that commercially marketable quantities were caught in Arizona as recently as 1949. In the Upper Basin, razorback suckers were reported in the Green River to be very abundant near Green River, Utah, in the late 1800's (Jordan 1891). An account in Osmundson and Kaeding (1989) reported that residents living

along the Colorado River near Clifton, Colorado, observed several thousand razorback suckers during spring runoff in the 1930's and early 1940's. In the San Juan River drainage, Platania and Young (1989) relayed historical accounts of razorback suckers ascending the Animas River to Durango, Colorado, around the turn of the century. Platania and Young (1989) also reported the 1976 capture of two adult razorback suckers by VTN Consolidated, Inc., from an irrigation pond adjacent to the San Juan River near Bluff, Utah.

In August 1990, the New Mexico Department of Game and Fish (Lief Ahlm, NMGF, pers. comm.) interviewed two anglers from Aztec, New Mexico, who claimed to have "commonly" caught razorback suckers in the Animas River near Cedar Hill bridge in the 1930's and 1940's. When the two men were shown a battery of photographs, including roundtail chub (Gila robusta), humpback chub (Gila cypha), bonytail (Gila elegans), bluehead sucker (Pantosteus discobolus), flannelmouth sucker (Catostomus latipinis), razorback sucker, and Colorado squawfish, they both immediately identified the razorback sucker as the fish they had caught. However, prior to the 1976 capture by VTN Consolidated, Inc., there were no scientifically verified reports of razorback sucker captures in the San Juan River drainage.

A marked decline in populations of razorback suckers can be attributed to construction of dams and reservoirs, introduction of nonnative fishes, and removal of large quantities of water from the Colorado River system. Dams on the main stem Colorado River and its major tributaries have segmented the river system and drastically altered flows, temperatures, and channel geomorphology. Major changes in species composition have occurred due to the introduction of numerous nonnative fishes, many of which have thrived due to man-induced changes to the natural riverine system.

The current distribution and abundance of the razorback sucker have been significantly reduced throughout the Colorado River system (McAda 1987; McAda and Wydoski 1980; Holden and Stalnaker 1975; Minckley 1983; Marsh and Minckley 1989; Tyus 1987). The only substantial population of razorback suckers remaining, made up entirely of old adults (McCarthy and Minckley 1987), is found in Lake Mohave; however, they do not appear to be successfully recruiting. While limited numbers of razorback suckers persist in other locations in the Lower Colorado River, they are considered rare or incidental and may be continuing to decline.

In the Upper Basin, above Glen Canyon Dam, razorback suckers are found in limited numbers in both lentic and lotic environments. The largest population of razorback suckers in the Upper Basin is found in the upper Green River and lower Yampa River (Tyus 1987). Lanigan and Tyus (1989) estimated that from

758 to 1,138 razorback suckers inhabit the upper Green River. In the Colorado River, most razorback suckers occur in the Grand Valley area near Grand Junction, Colorado; however, they are increasingly rare. Osmundson and Kaeding (1991) report that the number of razorback sucker captures in the Grand Junction area has declined dramatically since 1974.

In the San Juan River subbasin, small concentrations of razorback suckers have been reported at the inflow area in the San Juan arm of Lake Powell, Utah (Meyer and Moretti 1988), and one specimen was captured in the San Juan River near Bluff, Utah, in 1988 (Platania 1990; Platania et al. 1991). In Bestgen (1990) additional captures of small numbers of razorback suckers also were reported from the Dirty Devil and Colorado River arms of Lake Powell.

Razorback suckers are in imminent danger of extirpation in the wild. The specific causes of this species' continued decline are largely unknown at this time. As Bestgen (1990) pointed out:

> "Reasons for decline of most native fishes in the Colorado River Basin have been attributed to habitat loss due to construction of mainstream dams and subsequent interruption or alteration of natural flow and physio-chemical regimes, inundation of river reaches by reservoirs, channelization, water quality degradation, introduction of nonnative fish species and resulting competitive interactions or predation, and other man-induced disturbances (Miller 1961, Joseph et al. 1977, Behnke and Benson 1983, Carlson and Muth 1989, Tyus and Karp 1989). These factors are almost certainly not mutually exclusive, therefore it is often difficult to determine exact cause and effect relationships."

The virtual absence of any recruitment suggests a combination of biological, physical, and/or chemical factors that may be affecting the survival and recruitment of early life stages of razorback suckers. Within the Upper Basin, recovery efforts endorsed by the Recovery Implementation Program include the capture and removal of razorback suckers from all known locations for genetic analyses and development of discrete brood stocks if necessary. These measures have been undertaken to develop refugia populations of the razorback sucker from the same genetic parentage as their wild counterparts such that, if these fish are genetically unique by subbasin or individual population, then separate stocks will be available for future augmentation. Such augmentation may be a necessary step to prevent the extinction of razorback suckers in the Upper Basin.

Beginning in May 1987 and continuing through October 1989, complementary investigations of fishes in the San Juan River were conducted in Colorado, New Mexico, and Utah (Platania 1990; Platania et al. 1991). In 1987, a total of 18 adult razorbacks (6 recaptures) were collected on the south shore of the San Juan arm of Lake Powell (Platania 1990; Platania et al. 1991). These fish were captured near a concrete boat ramp at Piute Farms Marina and were believed to be either a spawning aggregation or possibly a staging area used in preparation for migration to some other spawning site. Of the 12 individual razorbacks handled in 1987, 8 were running ripe males while the other 4 specimens were females that appeared gravid.

In 1988, a total of 10 razorback suckers were handled at the same general location, 5 of which were in reproductive condition (Platania et al. 1991). Six of the ten individual specimens in the 1988 samples were recaptures from 1987. Also, in 1988, a single adult tuberculate male razorback sucker was captured at approximately river mile 80 on the San Juan River near Bluff, Utah. Particularly noteworthy is that this is the first confirmed record of this species from the main stem San Juan River. The presence of this reproductively mature specimen suggests that the razorback may be attempting to spawn in some unknown location within the riverine portion of the San Juan drainage. No razorback suckers were captured in 1989. No larval specimens, nor any other size classes of razorbacks (other than adults), have ever been documented in the San Juan River drainage.

All recent captures of wild razorback suckers in the upper basin have been mature adults. In 1994, an experimental augmentation program was initiated on the San Juan River; 30 radio tagged razorback suckers and 656 razorback suckers marked with passive integrated transponder tags were released in the San Juan River. There is no evidence anywhere in the Colorado River system that indicates significant recruitment to any population of razorback sucker (Bestgen 1990, Platania 1990, Platania et al. 1991, Tyus 1987, McCarthy and Minckley 1987, Osmundson and Kaeding 1989).

The existing scientific literature and historic accounts by local residents strongly suggests that razorback suckers were once a viable, reproducing member of the native fish community in the San Juan River drainage. Currently, the razorback sucker is rare throughout its historic range and extremely rare in the main stem San Juan River.

Critical Habitat

Critical habitat has been designated within the 100-year floodplain of the razorback sucker's historical range in the following sections of the Upper Basin (59 F.R. 13374).

Colorado, Moffat County. The Yampa River and its 100-year floodplain from the mouth of Cross Mountain Canyon in T. 6 N., R. 98 W., section 23 (6th Principal Meridian) to the confluence with the Green River in T. 7 N., R. 103 W., section 28 (6th Principal Meridian).

Utah, Uintah County; and Colorado, Moffat County. The Green River and its 100-year floodplain from the confluence with the Yampa River in T. 7 N., R. 103 W., section 28 (6th Principal Meridian) to Sand Wash in T. 11 S., R. 18 E., section 20 (6th Principal Meridian).

Utah, Uintah, Carbon, Grand, Emery, Wayne, and San Juan Counties. The Green River and its 100-year floodplain from Sand Wash at river mile 96 at T. 11 S., R. 18 E., section 20 (6th Principal Meridian) to the confluence with the Colorado River in T. 30 S., R. 19 E., section 7 (6th Principal Meridian).

Utah, Uintah County. The White River and its 100-year floodplain from the boundary of the Uintah and Ouray Indian Reservation at river mile 18 in T. 9 S., R. 22 E., section 21 (Salt Lake Meridian) to the confluence with the Green River in T. 9 S., R 20 E., section 4 (Salt Lake Meridian).

Utah, Uintah County. The Duchesne River and its 100-year floodplain from river mile 2.5 in T. 4 S., R. 3 E., section 30 (Salt Lake Meridian) to the confluence with the Green River in T. 5 S., R. 3 E., section 5 (Uintah Meridian).

Colorado, Delta and Mesa Counties. The Gunnison River and its 100-year floodplain from the confluence with the Uncompahgre River in T. 15 S., R. 96 W., section 11 (6th Principal Meridian) to Redlands Diversion Dam in T. 1 S., R. 1 W., section 27 (Ute Meridian).

Colorado, Mesa and Garfield Counties. The Colorado River and its 100-year floodplain from Colorado River Bridge at exit 90 north off Interstate 70 in T. 6 S., R. 93 W., section 16 (6th Principal Meridian) to Westwater Canyon in T. 20 S., R. 25 E., section 12 (Salt Lake Meridian) including the Gunnison River and its 100-year floodplain from the Redlands Diversion Dam in T. 1 S., R. 1 W., section 27 (Ute Meridian)

to the confluence with the Colorado River in T. 1 S., R. 1 W., section 22 (Ute Meridian).

Utah, Grand, San Juan, Wayne, and Garfield Counties. The Colorado River and its 100-year floodplain from Westwater Canyon in T. 20 S., R. 25 E., section 12 (Salt Lake Meridian) to full pool elevation, upstream of North Wash, and including the Dirty Devil arm of Lake Powell in T. 33 S., R. 14 E., section 29 (Salt Lake Meridian).

New Mexico, San Juan County; and Utah, San Juan County. The San Juan River and its 100-year floodplain from the Hogback Diversion in T. 29 N., R. 16 W., section 9 (New Mexico Meridian) to the full pool elevation at the mouth of Neskahai Canyon on the San Juan arm of Lake Powell in T. 41 S., R. 11 E., section 26 (Salt Lake Meridian).

Biology

Specific information on biological and physical habitat requirements of the razorback sucker is very limited. Until very recently, fisheries research investigations throughout the Upper Basin have focused on the three listed Colorado River fishes, and data collected on the razorback sucker was largely coincident to those studies. Localized extirpation of razorback suckers from some localities, coupled with the species' continued decline in numbers and distribution, has prompted some research; however, details of its life history requirements, particularly in riverine environments, are still not fully understood.

In general, a natural hydrograph with a large spring peak, a gradually descending limb into early summer, and low stable flows through summer, fall, and winter are thought to create the best habitat conditions for endangered fishes while maintaining the integrity of the channel geomorphology. Prior to construction of large main stem dams and the suppression of spring peak flows, low velocity, off-channel habitats (seasonally flooded bottomlands and shorelines) were commonly available throughout the Upper Basin (Tyus and Karp 1989; Osmundson and Kaeding 1991). The absence of these seasonally flooded riverine habitats is believed to be a limiting factor in the successful recruitment of razorback suckers in their native environment (Tyus and Karp 1989; Osmundson and Kaeding 1991). Tyus (1987) and McAda and Wydoski (1980) reported springtime aggregations of razorback suckers in off-channel impoundments and tributaries; such aggregations are believed to be associated with reproductive activities. Tyus and Karp (1990) and Osmundson and Kaeding (1991) reported off-channel habitats to be much warmer than the main stem river and that razorback suckers presumably moved to these areas for feeding,

resting, sexual maturation, spawning, and other activities associated with their reproductive cycle. While razorback suckers have never been directly observed spawning in turbid riverine environments within the Upper Basin, captures of ripe specimens, both males and females, have been recorded (Valdez et al. 1982; McAda and Wydoski 1980; Tyus 1987; Osmundson and Kaeding 1989; Tyus and Karp 1989; Tyus and Karp 1990; Osmundson and Kaeding 1991; Platania 1990) in the Yampa, Green, Colorado, and San Juan Rivers. Sexually mature razorback suckers are generally collected on the ascending limb of the hydrograph from mid-April through June and are associated with coarse gravel substrates (depending on the specific location).

Outside of the spawning season, adult razorback suckers occupy a variety of shoreline and main channel habitats including low runs, shallow to deep pools, backwaters, eddies, and other relatively slow velocity areas associated with sand substrates (Tyus 1987; Tyus and Karp 1989; Osmundson and Kaeding 1989; Valdez and Masslich 1989; Osmundson and Kaeding 1991; Tyus and Karp 1990).

The virtual absence of any recruitment suggests a combination of biological, physical, and/or chemical factors that may be affecting the survival and recruitment of early life stages of razorback suckers. Within the Upper Basin, recovery efforts endorsed by the "Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River" (U.S. Fish and Wildlife Service 1987), include the capture and removal of razorback suckers from all known locations for genetic analyses and development of discrete brood stocks if necessary. These measures have been undertaken to develop refugia populations of razorback sucker from the same genetic parentage as their wild counterparts such that, if these fish are genetically unique by subbasin or individual population, then separate stocks will be available for future augmentation. Such augmentation may be a necessary step to prevent the extinction of razorback suckers in the Upper Basin.

Habitat requirements of young and juvenile razorback suckers in the wild are not well known, particularly in native riverine environments. Prior to 1991, the last confirmed documentation of razorback sucker juvenile in the Upper Basin was a capture in the Colorado River near Moab, Utah (Taba et al. 1965). In 1991, two early juvenile (36.6 and 39.3 mm TL) razorback suckers were collected in the lower Green River near Hell Roaring Canyon (Gutermuth et al. 1994). Juvenile razorback suckers have been collected in recent years from Old Charley Wash, a wetland adjacent to the Green River (Modde 1996). Between 1992 and 1995 larval razorback suckers were collected in the middle and lower Green River and within the Colorado River inflow to Lake Powell (Muth 1995).

Razorback Sucker Activity in the 15-mile Reach

Osmundson and Kaeding (1989) found that 76 percent of the razorback suckers captured in the Colorado River between 1979 and 1985 were captured in the Grand Valley area. Results of surveys conducted during May and June of 1986-1988 indicate that areas within the 15-mile reach may be concentration points for the razorback sucker during spring runoff. Male and female razorback suckers in spawning condition have been found in the 15-mile reach, although no larvae or juveniles have been found. Although data is limited, Osmundson and Kaeding (1989) think razorback suckers may move into the 15-mile reach to spawn in the spring, but most spend the remainder of the year in an 18-mile reach downstream from the confluence of the Gunnison River.

The current range of the razorback sucker in the Colorado River extends upstream to Rifle, Colorado. Most razorback suckers captured in the Grand Valley area have been located in flooded gravel-pit ponds adjacent to the river. However, Osmundson and Kaeding (1989) documented razorback sucker movement in various river habitats in the Grand Valley area. They documented razorback suckers in the 15-mile reach as far upstream as river mile 183.6. Additional surveys since 1988 have documented razorback suckers in riverside ponds as far upstream as river mile 235 near Rifle, Colorado (Burdick 1992).

Razorback Sucker Activity: San Juan River

Because razorback sucker are so rare in the San Juan River and spawning or recruitment have not been documented, an experimental stocking program was initiated. In March of 1994, fifteen radio-tagged razorback sucker were stocked in the San Juan River at Bluff, Utah (river mile 79.6); near Four Corners Bridge (river mile 117.5); and above the Mixer in New Mexico (136.6). In November of 1994 an additional 15 radio-tagged adults were stocked as well as 656 PIT-tagged fish in the same locations as well as an additional site just below the Hogback Diversion in New Mexico (river mile 158.5). Monitoring found that these razorback suckers used slow or slackwater habitats such as eddies, pools, backwaters, and shoals in March and April and fast water 92.2 percent of the time in June and August (Ryden and Pfeifer 1995b). During 1995, both radio-tagged fish and PIT tagged fish were contacted or captured. Razorback suckers were found in small numbers from the Hogback Diversion (river mile 158.5) to 38.1 river miles above Lake Powell (Dale Ryden, USFWS, pers. comm.)

Humpback Chub

The humpback chub is endemic to the Colorado River Basin and is part of a native fish fauna traced to the Miocene epoch in fossil records (Miller 1958; Minckley et al. 1986). Humpback chub remains have been dated to about 4000 B.C., but the fish was not described as a species until the 1940's (Miller 1946), presumably because of its restricted distribution in remote white water canyons (USFWS 1990b). Because of this, its original distribution is not known.

Until the 1950's, the humpback chub was known only from Grand Canyon. During surveys in the 1950's and 1960's humpback chub were found in the upper Green River including specimens from Echo Park, Island Park, and Swallow Canyon (Smith 1960, Vanicek et al. 1970). Individuals were also reported from the lower Yampa River (Holden and Stalnaker 1975b), the White River in Utah (Sigler and Miller 1963), Desolation Canyon of the Green River (Holden and Stalnaker 1970) and the Colorado River near Moab (Sigler and Miller 1963).

Today the largest populations of this species occur in the Little Colorado and Colorado rivers in the Grand Canyon, and in the Black Rocks area of the Colorado River. Other populations have been reported in Westwater and Debeque Canyons of the Colorado River, Desolation and Gray Canyons of the Green River, Yampa and Whirlpool Canyons in Dinosaur National Monument (USFWS 1990b). One individual was recently captured in the Gunnison River (Burdick 1995).

Little is known about the specific spawning requirements of the humpback chub. It is known that the fish spawn soon after the highest spring flows when water temperatures approach 68° F (Kaeding et al. 1990; Karp and Tyus 1989; USFWS 1990b). The collection of ripe and spent fish indicated that spawning occurred in Black Rocks during June 2-15, 1980, at water temperatures of 53° to 61° F; in 1981, spawning occurred May 15-25, at water temperatures of 61°-61.7° F (Valdez et al. 1982). Humpback chub spawned in Black Rocks on the Colorado River in 1983 when maximum daily water temperatures were 55° to 63° (Archer et al. 1985).

Backwaters, eddies, and runs have been reported as common capture locations for young-of-year humpback chub (Valdez and Clemmer 1982). These data indicate that in Black Rocks and Westwater Canyon, young utilize shallow areas. Habitat suitability index curves developed by Valdez et al. (1990) indicate young-of-year prefer average depths of 2.1 feet with a maximum of 5.1 feet. Average velocities were reported at 0.2 feet per second.

Valdez et al. (1982) and Wick et al. (1979, 1981) found adult humpback chub in Black Rocks and Westwater Canyons in water averaging 50 feet in depth with a maximum depth of 92 feet. In these localities, humpback chub were associated with large boulders and steep cliffs.

Generally, humpback chub show fidelity for canyon reaches and move very little (Miller et al. 1982; Archer et al. 1985; Burdick and Kaeding 1985; Kaeding et al. 1990). Movements of adult humpback chub in Black Rocks on the Colorado River were essentially restricted to a one mile reach. These results were based on the recapture of Carlin-tagged fish and radiotelemetry studies conducted from 1979 to 1981 (Valdez et al. 1982) and 1983 to 1985 (Archer et al. 1985; USFWS 1986; Kaeding et al. 1990).

Critical Habitat

Critical habitat has been designated within the humpback chub's historical range in the following sections of the Upper Basin (59 F.R. 13374).

Colorado, Moffat County. The Yampa River from the boundary of Dinosaur National Monument in T. 6 N., R. 99 W., section 27 (6th Principal Meridian) to the confluence with the Green River in T. 7 N., R. 103 W., section 28 (6th Principal Meridian).

Utah, Uintah County; and Colorado, Moffat County. The Green River from the confluence with the Yampa River in T. 7 N., R. 103 W., section 28 (6th Principal Meridian) to the southern boundary of Dinosaur National Monument in T. 6 N., R. 24 E., section 30 (Salt Lake Meridian).

Utah, Uintah and Grand Counties. The Green River (Desolation and Gray Canyons) from Sumner's Amphitheater in T. 12 S., R. 18 E., section 5 (Salt Lake Meridian) to Swasey's Rapid in T. 20 S., R. 16 E., section 3 (Salt Lake Meridian).

Utah, Grand County; and Colorado, Mesa County. The Colorado River from Black Rocks in T. 10 S., R. 104 W., section 25 (6th Principal Meridian) to Fish Ford in T. 21 S., R. 24 E., section 35 (Salt Lake Meridian).

Utah, Garfield and San Juan Counties. The Colorado River from Brown Betty Rapid in T. 30 S., R. 18 E., section 34 (Salt Lake Meridian) to Imperial Canyon in T. 31 S., R. 17 E., section 28 (Salt Lake Meridian).

Bonytail

The bonytail is the rarest native fish in the Colorado River. Formerly reported as widespread and abundant in mainstem rivers (Jordan and Evermann 1896), its populations have been greatly reduced. The fish is presently represented in the wild by a low number of old adult fish in Lake Mohave and perhaps other lower basin reservoirs (USFWS 1990a). The last known riverine area where bonytail were common was the Green River in Dinosaur National Monument, where Vanicek (1967) and Holden and Stalnaker (1970) collected 91 specimens during 1962 -1966. From 1977 to 1983, no bonytail were collected from the Colorado or Gunnison rivers in Colorado or Utah (Wick et al. 1979, 1981; Valdez et al. 1982b; Miller et al. 1984). However, in 1984, a single bonytail was collected from Black Rocks on the Colorado River (Kaeding et al. 1986). Several suspected bonytail were captured in Cataract Canyon in 1985-1987 (Valdez 1990).

The bonytail is considered a species that is adapted to mainstem rivers, where it has been observed in pools and eddies (Vanicek 1967; Minckley 1973). Spawning of bonytail has never been observed in a river, but ripe fish were collected in Dinosaur National Monument during late June and early July suggesting that spawning occurred at water temperatures of about 64° F (Vanicek and Kramer 1969).

Critical Habitat

Critical habitat has been designated within the bonytail's historical range in the following sections of the Upper Basin (59 F.R. 13374).

Colorado, Moffat County. The Yampa River from the boundary of Dinosaur National Monument in T. 6 N., R. 99 W., section 27 (6th Principal Meridian) to the confluence with the Green River in T. 7 N., R. 103 W., section 28 (6th Principal Meridian).

Utah, Uintah County; and Colorado, Moffat County. The Green River from the confluence with the Yampa River in T. 7 N., R. 103 W., section 28 (6th Principal Meridian) to the boundary of Dinosaur National Monument in T. 6 N., R. 24 E., section 30 (Salt Lake Meridian).

Utah, Uintah and Grand Counties. The Green River (Desolation and Gray Canyons) from Sumner's Amphitheater in T. 12 S., R. 18 E., section 5 (Salt Lake Meridian) to Swasey's Rapid (river mile 12) in T. 20 S., R. 16 E., section 3 (Salt Lake Meridian).

Utah, Grand County; and Colorado, Mesa County. The Colorado River from Black Rocks (river mile 137) in T. 10 S., R. 104 W., section 25 (6th Principal Meridian) to Fish Ford in T. 21 S., R. 24 E., section 35 (Salt Lake Meridian).

Utah, Garfield and San Juan Counties. The Colorado River from Brown Betty Rapid in T. 30 S., R. 18 E., section 34 (Salt Lake Meridian) to Imperial Canyon in T. 31 S., R. 17 E., section 28 (Salt Lake Meridian).

FLOW RECOMMENDATIONS FOR THE 15-MILE REACH

The 15-mile reach has experienced major agricultural water depletions for many years. During late summer and early fall, this reach can be severely dewatered. Although it experiences major water depletions, the 15-mile reach is viewed as critical to the recovery of Colorado River populations of Colorado squawfish and razorback sucker. The development of recommended flows in the 15-mile reach, therefore, was identified as important to achieving recovery of these species.

The Service first developed flow recommendations in 1989 and 1991. The summer flow recommendations (Kaeding and Osmundson 1989) were developed using the Instream Flow Incremental Methodology. The spring and winter flow recommendations (Osmundson and Kaeding 1991) were based on other methodologies. Serious shortcomings of the IFIM approach in developing flow recommendations for endangered fish in the Upper Colorado River led the Service to initiate a new study for determining recommended summer and winter flows. Using new information obtained from this study as well as that collected by other researchers, the Service updated and refined its earlier flow recommendations (Osmundson et al. 1995).

The Service's 1989 flow recommendations for summer were developed by modeling microhabitats based on depth, velocity, and substrate measurements at a site thought to be representative of the reach. The Service's 1991 flow recommendations for winter consisted of a tentative recommendation that flows not fall below historic levels; this recommendation was based on the assumption that historic conditions provided adequate winter habitat for adult fish. In refining these flow recommendations for summer and winter, the Service determined which habitat types (pools, riffles, etc.) were preferred by the fish during these seasons and then determined the flow level at which the preferred habitat types are maximized in area. This approach, as with other instream flow methodologies, assumes that increases in the amount of preferred or optimum habitat increases carrying capacity and, barring other potentially limiting factors, results in an increase in population size.

Earlier Service flow recommendations for spring were based on information on how the decrease in magnitude of spring flows could negatively affect endangered fish reproduction and survival. Data were provided which showed that low spring runoff resulted in lower squawfish larval production. The explanation for this relationship was that high flows are periodically needed to build cobble bars and flush fine sediment from the gravel/cobble substrates used by squawfish for spawning. Data were also provided which showed that razorback sucker spawning coincides with the peak runoff and occurs in warm, off-channel ponds and inundated floodplain habitats. The explanation for low razorback sucker reproduction was that, currently, flows often do not reach levels high enough to inundate low-lying floodplain features where spawning takes place. The Service also reported that in the absence of high spring flows, important backwater habitats filled with silt and sand, tamarisk colonized sand and cobble bars, and nonnative minnows capable of preying on or competing with larval endangered fishes greatly increased in numbers.

The Service's earlier flow recommendations for spring identified the magnitude and frequency of a range of minimum peak flows and the mean monthly flows capable of producing these peaks and of maintaining the natural shape of the hydrograph. Refinement of these earlier flow recommendations for spring was based on the results of new streambed monitoring studies. The results of one study showed that the spring runoff in 1993, which peaked at 25,900 cfs, was capable of moving coarse bed materials thereby winnowing accumulated fines from the channel substrate. Osmundson et al. (1995) suspected that the earlier recommended peak of 23,500 cfs would also be capable of moving bed materials. The results of another study showed that a spring runoff with a peak of about 12,900 was capable of flushing accumulated fine sediments from the bottoms of backwaters thereby restoring their depth. Based on this information, the Service developed recommended peak spring flows:

Target Peak Spring Flows in the 15-mile Reach:

>23,500 cfs (5 in 20 years)
21,750 cfs (5 in 20 years)
16,700 cfs (6 in 20 years)
12,900 cfs (4 in 20 years)

The Service's 1995 year-round flow recommendations are summarized in Table 1 as mean monthly discharges. Spring (April-July) recommendations are further subdivided into 10-day increments and are reported in Table 2 as volumes of water needed for each of twelve 10-day time periods. Variation in precipitation levels from year to year is taken into account and recommendations are provided for years of high, above-average, below-average,

and low snow fall. With the exception of winter, recommendations are for flows considerably lower than historic levels but somewhat higher than recent levels.

Table 1. Recommended mean monthly flows for the top of the 15-mile reach in cubic feet per second. Rate is the percent of years that the recommended flows should be provided based on winter snowpack levels. For example, in the wettest 25 percent of years, flows in June should average at least 15,660 cfs; stated another way, this recommendation should be met in five of every 20 years. During low-water years, June flows should average no less than 6,850 cfs, and such a minimum should occur at a rate of no more than 4 in 20 years (20 percent).

Rate	25%	25%	30%	20%
Exceedance	25%	50%	30%	100%
JAN	1,630	1,630	1,630	1,240
FEB	1,630	1,630	1,630	1,240
MAY	1,630	1,630	1,630	1,240
APR	3,210	2,440	2,260	1,860
MAY	10,720	9,380	7,710	7,260
JUN	15,660	14,250	11,350	6,850
JUL	7,060	5,370	3,150	1,480
AUG	1,630	1,630	1,240	810
SEP	1,630	1,630	1,240	810
OCT	1,630	1,630	1,240	810
NOV	1,630	1,630	1,630	1,240
DEC	1,630	1,630	1,630	1,240

Table 2. Volumes of water (in hundreds of acre-feet) needed per 10-day period to produce hydro-graphs recommended for the 15-mile reach during the spring runoff period (April, May, June and July). AP-1 represents the first 10 days in April; AP-2, the second 10 days, etc.

Rate	25%	25%	30%	20%
Exceedance	25%	50%	80%	100%
AP-1	317	276	295	245
AP-2	563	450	416	343
AP-3	1,029	726	634	519
MA-1	1,573	1,104	957	892
MA-2	2,073	1,817	1,516	1,488
MA-3	2,944	2,846	2,267	2,085
JN-1	3,197	2,770	2,566	1,778
JN-2	3,209	3,066	2,368	1,404
JN-3	2,914	2,643	1,516	893
JL-1	2,060	1,617	990	470
JL-2	1,328	977	578	246
JL-3	955	707	372	194

Bald Eagle

The bald eagle (Haliaeetus leucocephalus) was downlisted to federally threatened by the U.S. Fish and Wildlife Service on 12 July 1995, primarily because of its population rise and expanded range (60 FR 36000). Bald eagles also are protected under the Bald Eagle Protection Act of 8 June 1940 and the Migratory Bird Treaty Act of 3 July 1918 in all states except Alaska.

Found primarily along the coasts of North America, the bald eagle also inhabits areas associated with inland lakes and rivers from the Gulf of Mexico north to the Arctic (Snow 1973). Although the breeding range of the bald eagle formally included most of the continent (USFWS 1986), the largest breeding populations of bald eagles are found in southern Alaska (Grier et al. 1983). The winter range of the bald eagle includes most of its breeding

range; however, most eagles winter from southern Alaska south to central Arizona and New Mexico (Steenhof 1978). The largest wintering concentrations of eagles occur in the Klamath Basin, California; in the western states along the Mississippi, Missouri, Illinois, Platte, and Arkansas Rivers; and in the northwest states including Washington, Oregon, Idaho, and western Montana. (Spencer 1976).

Bald eagle nests are typically found in mature, heterogenous stands of multi-storied trees that have sturdy branches at sufficient height for nest support and protection. Optimum nest sites are typically found in close proximity to open water, which provides an adequate food source. Good visibility and a clear flight path also are important nest site characteristics (Grubb 1976). Eagles tend to have a high annual fidelity to nest sites and will repair and rebuild nests when needed. Consequently, eagle nests may become very large over years of successive use; some nests are known to be as deep as two to three feet deep and up to five feet in diameter (Grubb 1976; Anderson and Bruce 1980). Diets of eagles during the breeding season consist primarily of fish species, but eagles also will feed on songbirds, invertebrates, small mammals, and carrion (Grubb and Hansel 1978).

Bald eagles typically migrate from their breeding areas to their winter habitat between September and December. Winter habitat characteristics include areas of open water, adequate food sources, and sufficient diurnal perches and night roosts (Grubb and Kennedy 1982). Wintering bald eagles typically congregate in large numbers at communal roosts; however, roosts located in less populated areas may be used by individuals or small groups (Grubb and Kennedy 1982). Eagles are attracted to large bodies of water, particularly to areas downstream of hydroelectric dams where there is access to dead or dying fish or waterfowl (Cooksey 1962; Ingram 1965), but eagles also may occur in arid valleys (Edwards 1969). Food availability is probably the single most important factor affecting winter eagle distribution and abundance (Steenhof 1976). Recognized as an opportunistic feeder (Grubb and Kennedy 1982), bald eagles also will feed on waterfowl, particularly dead or crippled individuals, when fish are not readily available (Shickley 1961; Spencer 1976). Other food items include carrion (e.g., deer carcasses) and small mammals such as mice (Peromyscus spp.), cottontails (Sylvilagus spp.), jackrabbits (Lepus spp.), gophers (Thomomys spp.), woodrats (Neotoma spp.), and kangaroo rats (Dipodomys spp.) (Lish and Lewis 1975; Steenhof 1976; Beck 1980; Grubb and Kennedy 1982).

Perches are an essential element in the habitat selection by bald eagles (Stalmaster and Newman 1979). Vian (1971) suggests that perch sites must be in open view of potential food sources and generally within 160 feet of water.

However, Grubb and Kennedy (1982) suggest that specific perch sites are oriented to provide for a number of activities including: a good view of the adjacent water and surrounding area; maximum exposure to the sun, especially during morning hours on cold days; and maximum benefit to topography and diurnal wind currents for flight. Because night roost sites offer protection from predators and extreme weather conditions, large trees are typically preferred (Lish 1975). Eagles may roost individually or in small groups, and roosts may be used for successive years (Grubb and Kennedy 1982).

Peregrine Falcon

The American peregrine falcon (Falco peregrinus anatum) was first listed as federally endangered by the U.S. Fish and Wildlife Service on 13 October 1970, but has since been proposed to be delisted. The arctic peregrine falcon (F. p. tundrius) was delisted by the U.S. Fish and Wildlife Service on 5 October 1994 (59 FR 50796); however, migrants are still protected under the "similarity of appearance clause" of the Endangered Species Act.

The American peregrine falcon ranges from Canada and Alaska south to Mexico. Thought to be locally common throughout the west, it is believed that at least 238 to 346 active eyries existed in the western United States (Cade 1975). From 1975 to 1983, a total of 228 territories were located in the Rocky Mountain/Southwest region (USFWS 1984).

The peregrine falcon nests on cliffs, usually in mountainous areas in close proximity to water sources. In the Rocky Mountain region, nests are typically near ponderosa pine forests or piñon-juniper woodlands. Prey abundance and diversity in these habitats are thought to be a major factor in eyrie selection (USFWS 1984). Other habitat selection requirements may include inaccessible nest sites and isolation from human disturbances (Haynam and Sumner 1977). Peregrine falcon nest sites are often located on cliff faces with an overhanging ledge or rock outcrop. Nests are generally 150 feet or higher from the base of the cliff face (USFWS 1984), and are typically a scrape on a rock substrate (Enderson and Craig 1974; Cade 1960).

Peregrine falcons tend to have a high annual fidelity to nest sites and will return to the same nest in consecutive years; however, alternative nest sites may be used within individual breeding territories (Fyfe et al. 1976). Nesting typically occurs in mid-March. A clutch of three to four eggs are laid in early to late April. Both sexes may incubate eggs, although the female is the primary incubator. The incubation period is approximately 33 days. Both adults provide food for the nestlings. Young generally fledge in June or July and are soon independent from the adults (USFWS 1984).

Peregrine falcons typically forage within 10 miles of an occupied nest site, but have been reported to travel up to 31 miles from eyries in Colorado (Gerald Craig, Colorado Division of Wildlife, pers. comm. 1994). Preferred foraging areas include marshes, lakes, rivers, and wet meadows (Porter and White 1973; USFWS 1984). Diets of peregrine falcons consist almost exclusively of bird species. Blackbirds, jays, doves, shorebirds, and smaller songbirds are common food items (USFWS 1984).

Mexican Spotted Owl

The Mexican spotted owl (Strix occidentalis lucida) was federally listed as threatened by the U.S. Fish and Wildlife Service on 16 March 1993 (58 FR 14271), primarily because of habitat loss caused by forest management practices such as logging, fire suppression, and grazing (USFWS 1995b). In 1995, designated critical habitat was determined for this subspecies (USFWS 1995c); however, due to a 1997 court case critical habitat is currently removed. Preferred habitat for the Mexican spotted owl in Colorado has been further defined by Johnson (1997).

In the central and southern parts of the Mexican spotted owl's range (Mexico, Arizona, New Mexico), habitat of the Mexican spotted owl is comprised of canyons and uplands with mixed-conifer forests, although ponderosa pine and spruce-fir forests are sometimes used (Ganey et al. 1988). In Arizona and New Mexico, owls were found from 5,900 to 10,000 feet (Ganey et al. 1988). In Colorado, all Mexican spotted owls have been found in deep sheer-walled, sandstone or rocky canyons from 5,550 to 9,400 feet (Johnson and Reynolds 1996; Johnson 1997). These canyons contained either ponderosa pine and mixed-conifer forests or piñon/juniper forests with small, isolated patches of Douglas-fir (Reynolds and Johnson 1994). Habitat use and distribution patterns vary throughout the owls range, presumably because of regional habitat constraints and prey availability (USFWS 1995b). Research strongly suggests that the primary habitat of the Mexican spotted owl in Colorado is deep canyons (Johnson 1997). Furthermore, examination of summer habitat-use showed that owls prefer steep and narrow portions of canyons for nesting and roosting (Johnson 1997).

The spotted owl is typically a cavity nester (Forsman et al.1984); however, Ganey et al. (1988) reported that most Mexican spotted owl nests were on stick or debris platforms in trees, cliff ledges, and in potholes on cliffs. In Colorado, all nests were either on stick platforms in potholes on cliffs, or were sandy depressions on cliff ledges (Johnson 1997).

Diets of spotted owls consist primarily of small and medium-sized mammals, including flying squirrels (Glaucomys sabrinus), woodrats (Neotoma spp.), western gray squirrels (Sciurus griseus), and deer mice (Peromyscus spp.). However, diet composition varies geographically (Barrows 1981; Forsman et al. 1984; Solis 1984; Laymon 1985; Ganey and Balda 1985). In Colorado, diets of Mexican spotted owls consist primarily of woodrats, deer mice, and voles (Microtus spp.) (Johnson 1997).

Johnson (1997) suggested that Mexican spotted owls in Colorado might inhabit canyons because: 1) canyons mimic the canopy cover and cooler temperatures found in old-growth forests and, therefore, provide for the owls' thermoregulatory requirements; 2) rocky canyons provide suitable potholes, ledges, and caves, for nesting and roosting; and 3) rock habitats provide habitat for woodrats, a major prey of Colorado Mexican spotted owls.

Southwestern Willow Flycatcher

The southwestern willow flycatcher is a small passerine bird (Order Passeriformes; Family Tyrannidae) approximately 5.75 inches long. It has a grayish-green back and wings, whitish throat, light grey-olive breast, and pale yellowish belly. Two whitish or buff wingbars are visible, the eye ring is faint or absent. The upper mandible is dark, the lower is light grading to dark at the tip. The southwestern willow flycatcher is a riparian obligate, nesting in riparian thickets associated with rivers, streams, and other wetlands where dense growth of willow (Salix sp.), Baccharis, buttonbush (Cephalanthus sp.), boxelder (Acer negundo), tamarisk (Tamarix sp.) or other plants are present, often with a scattered overstory of cottonwood (Populus sp.).

Surface water or saturated soils are usually present or nearby, especially early in the breeding season. At some nest sites surface water may be present early in the breeding season with only damp soil present by late June or early July (Muiznieks et al. 1994, Sferra et al. 1995). The species composition and structure of nesting habitat varies across the range from homogeneous patches of only one or several shrub or tree species that form a single cover layer up to approximately 6 meters (20 feet), to structurally heterogeneous patches of many tree and shrub species with distinct overstory and sub-canopy levels (Brown 1988, Whitfield 1990, Sedgewick and Knopf 1992, Muiznieks et al. 1994, Tibbitts et al. 1994, Sferra et al. 1995).

The flycatcher is a neotropical migratory species that breeds in the southwestern U.S. and migrates to Mexico, Central America, and possibly northern South America during the non-breeding season. The historical range

of the southwestern willow flycatcher included southern California, Arizona, New Mexico, western Texas, southwestern Colorado, southern Utah, extreme southern Nevada, and extreme northwestern Mexico (Sonora and Baja)(Unitt 1987).

Life History

The southwestern willow flycatcher is an insectivore, foraging within and above dense riparian vegetation, taking insects on the wing or gleaning them from foliage (Wheelock 1912, Bent 1960). No information is available on specific prey species.

The flycatcher begins arriving on breeding grounds in late April and May (Sogge and Tibbitts 1992, Sogge et al. 1993, Sogge and Tibbitts 1994, Muiznieks et al. 1994, Maynard 1995, Sferra et al. 1995). Migration routes are not completely known. However, flycatchers, probably including sub-species E.t. brewsteri and E.t. adastus, have been documented migrating through drainages in Arizona that do not currently support breeding populations, including upper San Pedro River (Bureau of Land Management, unpubl. data), Colorado River through Grand Canyon National Park (Sogge and Tibbitts 1992, Sogge et al. 1993, Sogge and Tibbitts 1994), lower Colorado River (Muiznieks et al. 1994, Sferra et al. in prep.), and Verde River tributaries (Muiznieks et al. 1994).

Flycatchers of the genus Empidonax rarely sing during fall migration, so that a means of distinguishing subspecies without a specimen is not feasible (Blake 1953, Peterson and Chalif 1973). However, willow flycatchers have been reported to sing and defend winter territories in Mexico and Central America (Gorski 1969, McCabe 1991). Willow flycatchers winter in Mexico, Central America, and perhaps northern South America (Phillips 1948, Stiles and Skutch 1989, Peterson 1990, Ridgely and Tudor 1994).

Southwestern willow flycatchers begin nesting in late May and early June and fledge young from late June through mid-August (Willard 1912, Ligon 1961, Brown 1988, Whitfield 1990, Sogge and Tibbitts 1992, Sogge et al. 1993, Muiznieks et al. 1994, Whitfield 1994, Maynard 1995). Southwestern willow flycatchers typically lay 3 to 4 eggs in a clutch (range = 2-5). The breeding cycle, from laying of the first egg to fledgling, is approximately 28 days. Eggs are laid at one day intervals (Bent 1960, Walkinshaw 1966, McCabe 1991); they are incubated by the female for approximately 12 days; and young fledge approximately 12 to 13 days after hatching (King 1955, Harrison 1979). Southwestern willow flycatchers typically raise one brood per year but have been documented raising two broods during one season (Whitfield 1990).

Southwestern willow flycatchers have also been documented renesting after nest failure (Whitfield 1990, Sogge and Tibbitts 1992, Sogge et al. 1993, Sogge and Tibbitts 1994, Muiznieks et al. 1994).

Data on survival rates and longevity of E.t. extimus adults and young are not yet available. Walkinshaw (1966), who studied E.t. traillii in Michigan, estimated that 40.9 percent of the males at his study site returned to breed for two years, 22.7 percent returned for three years, 13.6 percent returned for four years, and 4.5 percent returned during their fifth year. Females return rates were substantially lower. Only 22.6 percent returned to breed for one year. These data are consistent with survival rates for other passerines (Gill 1990, chap. 21) and suggest that the lifespan of most E.t. extimus probably is two to three years.

The southwestern willow flycatcher is a frequent host of the brown-headed cowbird (Molothrus ater; Muiznieks et al. 1994, Whitfield 1994, Sferra et al. 1995, Sogge 1995b). Cowbirds lay their eggs in the nests of other species directly affecting their hosts by reducing nest success. Cowbird parasitism reduces host nest success in several ways. Cowbirds may remove some of the host's eggs, reducing overall fecundity. Hosts may abandon parasitized nests and attempt to renest, which can result in reduced clutch sizes, delayed fledgling, and reduced overall nesting and success and fledgling survivorship (Whitfield 1994). Cowbird eggs, which require a shorter incubation period than those of many passerine hosts, hatch earlier giving cowbird nestlings a competitive advantage over the host's young for parental care (Bent 1960, McGeen 1972, Mayfield 1977, Brittingham and Temple 1983). Where studied, high rates of cowbird parasitism have coincided with southwestern willow flycatcher population declines, or, at a minimum, resulted in reduced or complete elimination of nesting success (Muiznieks et al. 1994, Whitfield 1994, Sferra et al. 1995, Sogge 1995b).

Population Dynamics

Population size: Current estimates for total numbers of remaining southwestern willow flycatchers are 500 or fewer nesting pairs rangewide (Unitt 1987, USFWS 1995a). Approximately 100 territorial males are estimated to occur in southern California, with most nesting groups occurring in three drainages (Whitfield 1993, Griffith and Griffith 1994). Approximately 119 territorial males were located during statewide surveys in Arizona in 1994 (Sferra et al. 1995). Approximately 120 territorial males were located in New Mexico during statewide surveys in 1994 (Parker and Hull 1994, Maynard 1995). In Colorado there have been about 67 singing males detected at 22 sites over

four years of surveys from 1994 to 1997. In 1997 alone, there were 47 singing males and a suspected 13 pairs at nine sites.

Population stability: Southwestern willow flycatcher breeding populations are small and unstable. The Service believes that at current population levels, and with continuing threats, extinction of this species is foreseeable. Southwestern willow flycatchers are absent from many areas previously occupied or are present in reduced numbers (Hubbard 1987, Unitt 1987, Sogge et al. 1993, Sogge and Tibbitts 1994, Muiznieks et al. 1994, Sferra et al. 1995). Former populations in Arizona on the lower Salt River, Santa Cruz River, and lower Colorado River near Yuma have been extirpated. Small groups of one to seven willow flycatcher territories have been detected on the Santa Maria River, lower San Pedro River, Verde River, upper Tonto Creek, upper Salt River, upper Gila River, Little Colorado River, and the Colorado River in Marble Canyon (Sogge et al. 1993, Sogge and Tibbitts 1994, Muiznieks et al. 1994, Sferra et al. 1995).

Nesting groups monitored on the Colorado River in the Grand Canyon have declined since monitoring began in 1984 (Sogge 1995b). In 1992, when comprehensive nest monitoring was initiated, two pairs were present, with only one establishing a nest. That nest successfully fledged three flycatchers (Sogge and Tibbitts 1992). In 1993, one breeding pair, one male with two females, and six unpaired males were detected. Three nests were found, all of which were parasitized by the brown-headed cowbird. None were successful in rearing flycatchers (Sogge et al. 1993). Four pairs and one unpaired male occupied the Grand Canyon in 1994. Nine nests were attempted, at least four of which were parasitized by cowbirds. All nesting attempts failed (Sogge and Tibbitts 1994). In summary, since 1992, 9 pairs of willow flycatchers have made 13 nesting attempts in the Grand Canyon, one of which successfully fledged three flycatchers.

A similar trend has been observed in the Verde Valley at Clarkdale where four pairs of southwestern willow flycatchers were first observed in 1992. In 1993, two pairs were present, one nest was documented and contained a single cowbird nestling (Muiznieks et al. 1994). In 1994, two pairs and one unpaired male were present. Two nests were found, one of which successfully fledged two flycatchers, the other fledged a single cowbird (Sferra et al. 1995). Data from 1995 indicates that two unpaired males occupied the Clarkdale site (Sogge 1995c).

In California along the Kern River, Whitfield (1993) documented a precipitous decline in the total flycatcher population (44 to 27 pairs) from 1989 to 1993. During that same period cowbird parasitism rates between 50 and 80 percent were also documented (Whitfield 1993). A cowbird trapping program initiated

in 1992 has reduced cowbird parasitism rates to ≤ 10 percent and appears to have stabilized population numbers at Kern River.

Additional habitat losses will likely include both small- and large-scale losses and be of the same types as known to date (i.e. habitat loss, fragmentation, and modification). The Service expects incidences of cowbird parasitism will vary spatially and temporally as a function of local cowbird population dynamics and local changes in the extent of riparian habitats.

The southwestern willow flycatcher's sensitivity to changes in habitat is high as a result of the small sizes of nesting groups, the small sizes of riparian habitats occupied, and the highly fragmented distribution of habitats. The extent of riparian habitat, its distribution, continuity, and species composition have been substantially altered in the Southwest (Phillips et al. 1964, Carothers et al. 1974, Rea 1983, Johnson and Haight 1984, Katibah 1984, Johnson et al. 1987, Franzreb 1987, Unitt 1987, General Accounting Office 1988, Szaro 1989, Dahl 1990, State of Arizona 1990). Changes in the extent and composition of riparian habitat decreases suitability and carrying capacity, thereby depressing numbers of flycatchers that can occupy an area. These effects have resulted in a contraction of the range occupied by the southwestern willow flycatcher, a reduction in the number of flycatcher populations rangewide, and in isolation of flycatcher populations, potentially changing historical emigration/immigration patterns and severing genetic exchange among populations.

The resilience of the southwestern willow flycatcher and its habitat are both relevant aspects of a species' survival. The southwestern willow flycatcher has declined in extent of range occupied and population size as a result of habitat loss, modification, and fragmentation. Riparian habitats by nature are dynamic, with their distribution in time and space governed mostly by flood events and flow patterns. Current conditions along southwestern rivers and streams are such that normal flow patterns have been greatly modified, catastrophic flood events occur with greater frequency as a result of degraded watershed conditions, stream channels are highly degraded, floodplains and riparian communities are reduced in extent, and the species composition of riparian communities modified with exotic species dominant. These conditions have significantly diminished the potential for southwestern rivers and streams to develop suitable habitat for the southwestern willow flycatcher. These factors, combined with the small size of flycatcher populations indicate that this species' resilience to disturbance is low.

The recovery rate of breeding populations will be a function of local population dynamics (i.e. total population size, annual reproductive success

and mortality rates, and rates of dispersal from other breeding locations) and habitat suitability. Because local populations are widely separated and small in size (Muiznieks et al. 1994, Sferra et al. 1995), recovery rates are anticipated to be very slow.

Uinta Basin Hookless Cactus

The Uinta Basin hookless cactus (K. Schum.) L. Benson, is a small barrel shaped cactus 3.0-18.0 cm tall with small pink to purple flowers up to 2.5 cm long. It also has relatively short spines, up to 3.6 cm long, which are hookless. It was listed as threatened on October 11, 1979 (44 FR 58870). Because individuals with hooked spines are occasionally found, it has been sometimes treated as a form of the common "fish hook" cactus of the Colorado Plateau, Sclerocactus whipplei (S. parviflorus), rather than a distinct species (Welsh 1993). However, the most rigorous statistical comparison of the two species, with multi variate analysis, demonstrates that the two are distinct species, with intermediate individuals in areas transitional between the ranges of the two species (Heil and Porter 1987).

The Uinta Basin hookless cactus has a bimodal distribution with one population in the Uinta Basin in Utah and the other in Colorado. The Colorado population has two sections, one near the town of DeBeque along the Colorado River, and the other along the Gunnison River beginning at Whitewater and extending upstream to about 20 miles east of Delta. The proposed project lies within both Colorado populations. The Uinta Basin hookless cactus generally occurs on river terrace deposits along the rivers or on fine textured sediments overlain by course fragments on mesa tops and slopes. They occasionally occur in fine textured outwash plains in association with greasewood. Most of the occurrences of the cactus are in mixed desert shrub communities with shadscale, Gardner saltbrush, budsage, Harriman yucca, Mormon tea, broom snakeweed, and galleta grass, with some occurrences in the lower edge of the piynon-juniper woodland. The species elevational range is between 4500 and 5900 feet.

ENVIRONMENTAL BASELINE

The environmental baseline includes the past and present impacts of all Federal, State, and private actions and other human activities in the action area; the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal section 7 consultation; and the impact of State or private actions contemporaneous with the consultation process.

In formulating this opinion, the Service considered adverse and beneficial effects likely to result from cumulative effects of future State and private activities that are reasonably certain to occur within the Project area, along with the direct and indirect effects of the Project and impacts from actions that are part of the environmental baseline (50 CFR 402.02 and 402.14 (g)(3)).

Endangered Fishes

The physical and biological features that were the basis for designating the critical habitat for the endangered fishes are water, physical habitat, and biological environment. These primary constituent elements were determined necessary for survival and recovery of the endangered fishes in the Colorado River. The primary constituent element water is described as a quantity of sufficient quality and with a hydrologic regime that is required for each life stage. Physical habitat includes areas of the river that are inhabited or potentially habitable by endangered fishes for use in spawning, nursery, feeding, and rearing or corridors between these areas. Biological environment includes food supply, predation, and competition.

Water Quantity

The environmental baseline for water quantity includes all historical depletions in the Upper Colorado and San Juan River Basin, depletions resulting from projects which have previously undergone section 7 consultation, and depletions resulting from projects contemporaneous with this consultation.

Water Quality

Some of the contaminants of concern within waters of the Upper Basin include heavy metals, selenium, salts, PAHs, and pesticides. Selenium is of particular concern because of its documented effects on fish (and wildlife) reproduction. Many chemical, physical, and biological factors affect the toxicity of environmental contaminants to biological organisms. Chemical and physical factors include contaminant type, chemical species or form, pH, water temperature, dissolved oxygen, hardness, salinity, and multiple-chemical exposure (antagonism and synergism). Duration of exposure, quantity of contaminant, and exposure pathways from the environment to the organism also affect toxicity. Some trace elements are beneficial to organisms at low concentrations but may be toxic at higher concentrations. Biological and physiological factors affecting toxicity include species, age, sex, and health of the organism.

Selenium concentrations can be elevated in areas where irrigation occurs on soils which are derived from or which overlie Upper Cretaceous marine sediments. Percolation of irrigation water through these soils and sediments leaches selenium into receiving waters. Other sources of selenium include powerplant fly ash and oil refineries. Water depletions, by reducing dilution effects, have increased the concentrations of selenium and other contaminants. Recent United States Geological Survey data collected in the Colorado River from 1990 to 1996 show that selenium concentrations under existing conditions (current level of development, not section 7 baseline) have been as high as 2 µg/L in the 15-mile reach and as high as 6 µg/L below the 15-mile reach. In 1995, Colorado's Water Quality Control Commission reduced the chronic selenium standard from 17 µg/L to 5 µg/L. The Service recommended the level be lowered to 2 µg/L.

Surface and ground water quality in the Animas, La Plata, Mancos, and San Juan River drainages have become significant concerns (Brogden et al. 1979). Potential heavy metal and/or selenium contamination in project-affected rivers and newly created reservoirs and the subsequent bioaccumulation in the food chain could become a problem for the predatory Colorado squawfish, as well as the razorback sucker.

Changes in water quality and contamination of associated biota are known to occur in similar Bureau projects in the San Juan drainage (i.e., irrigated lands on the Pine and Mancos Rivers) where return flows from irrigation make up a portion of the river flow or other aquatic sites downstream (Sylvester et al. 1988). Increased loading of the San Juan River and its tributaries with soil salts, elemental contaminants, and pesticides from irrigation return flows could potentially degrade water quality and cause harm to the endangered fishes.

Physical Habitat

Water depletions, by affecting the quantity and timing of flows, have reduced the ability of the river to create and maintain habitats and have reduced the frequency and duration of availability of certain habitats.

Habitat Formation

The formation of a variety of channel habitats, including gravel/cobble bars and substrates used by Colorado squawfish for spawning, is essential to ensure the availability of the range of habitats required by all endangered fish life stages to fulfill daily requirements (foraging, resting, spawning, avoiding predation, etc.) under various flow conditions. The number and distribution

of these channel habitats can be described as channel habitat complexity, diversity, or heterogeneity. Osmundson and Kaeding (1991) found that adult Colorado squawfish in the Grand Valley prefer river segments with a complex morphometry over those that are simple.

Some important habitats, such as inundated floodplain depressions used by razorback suckers for spawning, are located outside the channel. Floodplain depressions are principally derived from abandoned main channels, side-channels, backwaters, and meander cutoffs.

The creation of complex channel habitat and the formation and eventual abandonment of channel features from which floodplain depressions are formed occur primarily during spring runoff when flows are of sufficient size and duration to cause major changes in channel morphology through significant erosion and deposition of bed and bank materials. The reduction in the magnitude, duration, and frequency of high spring flows has slowed the rate at which channel morphology changes. Consequently, the creation of complex channel habitat and floodplain depressions has slowed. The placement of riprap and other bank stabilization measures and the construction of dikes and levees impede changes in channel morphology and contribute to the slowed creation of complex channel habitat. In addition, the construction of dikes and levees reduces existing channel habitat complexity by causing channelization of the river. Dikes and levees also isolate existing floodplain depressions from the channel during high flows. The slowed creation of complex channel habitats and new floodplain depressions, the reduction of existing channel habitat complexity, and the isolation of existing floodplain depressions have acted to reduce the quantity and quality of important habitat for endangered fishes.

Habitat Maintenance

Backwaters, used by various life stages of endangered fish, are damaged by the deposition of fine sediments which reduces their depth and consequently their duration and frequency of inundation. Gravel and cobble substrates, used by squawfish for spawning, are damaged by the infiltration of fine sediments. The establishment of vegetation on backwater sediments and on bars further reduces the value of these habitats for endangered fishes. Furthermore, higher flows are required to flush sediments from vegetated backwaters than from unvegetated ones. Osmundson and Kaeding (1991) reported observations that, on the 15-mile reach during the drought years of 1988 to 1990, backwaters were filling in with silt and spring flows were not sufficient to flush out the fine sediment. Also, they reported that tamarisk colonized sand and cobble bars. The lower frequency of high water years, therefore,

decreases the frequency at which silt and sand is flushed from backwaters, fine sediments are flushed from gravel/cobble substrates, and vegetation is scoured from backwaters and bars. As a result, the frequency at which these habitats are suitable for use by endangered fishes has decreased.

Seasonal Habitat Availability

Summer (August-October): Osmundson et al. (1995) reported that availability of habitats did not differ significantly between periods of moderate flows and low flows. Though absolute area of habitat decreases with declining flows, relative area or percent composition of habitat types changes little. However, squawfish habitat use patterns did change. The fish used a greater variety of habitats during moderate flows than during low flows. During moderate flows, the fish used primarily backwaters, eddies, and pools. During low flows, the fish used slow and fast runs almost exclusively. The change in habitat use without a corresponding change in relative habitat availability indicates that other factors also influence habitat selection. These factors could include changes in quality of physical habitat features such as diversity, depth, dissolved oxygen, etc., or changes in biotic interactions. Osmundson et al. (1995) interpreted the squawfish behavioral changes as reflective of suboptimal conditions; the behavioral changes demonstrate the ability of the species to modify their habitat use patterns to temporarily cope with adverse conditions and do not demonstrate habitat preferences under optimum conditions. Osmundson et al. (1995), therefore, based their flow recommendations on the habitat-selection behavior of adult squawfish observed during the higher somewhat more natural flow conditions.

Winter (November-March): Osmundson et al. (1995) reported that flows during the winter are usually moderate because no water is diverted for irrigation and because additional water is released through upstream dams to increase reservoir storage capacity in anticipation of spring runoff. The relative availability of slow runs and riffles during the winter was very similar to their availability during summer. As in the summer, backwaters, eddies, and pools were the preferred types of habitat in the winter. However, whereas eddies were most preferred in summer, pools were most preferred in winter. Adult squawfish used fewer habitat types overall during winter than during summer. Although fast runs and riffles were used during the summer, they were not used during the winter. The colder water temperatures in winter which cause lower metabolic rates may account for the avoidance of high velocity sites. Absolute area of pools increases as flows decrease and slow runs lose velocity. Because Osmundson et al. (1995) did not sample low flows in the winter, they could not determine if pools would still be preferred in the

winter at lower flows. Therefore, they recommended winter flows at the moderate flow level which maximized weighted area of preferred habitats.

Spring (April-July): Osmundson and Kaeding (1989) reported that squawfish use of low velocity habitats such as backwaters and flooded gravel pits is greatest during the spring runoff. It is believed that squawfish use these habitats during the runoff to escape the high velocity, low temperature flows of the main channel. Because backwaters, flooded gravel pits, and other low velocity habitats are considerably warmer than the main channel during the runoff, these habitats allow squawfish to extend their growing season substantially. The earlier warming of these habitats may also be important in enabling squawfish to reach spawning condition by the time flow and temperature in the main channel are optimum for spawning. Osmundson et al. (1995) reported that the numbers of backwaters and flooded gravel pits increases with increasing spring flows. (Although the number of backwaters eventually decreases as increasing flows convert backwaters to sidechannels, the number of other low velocity habitats likely increases as increasing flows inundate additional bottomlands.) The decrease in the magnitude, duration, and frequency of high spring flows, then, decreases the quantity and the duration and frequency of availability of important low velocity, higher temperature habitat in the spring. This could be affecting squawfish growth and spawning success.

Also, the quantity and frequency of availability of inundated floodplain depressions used by razorback suckers for spawning is dependent on the magnitude and frequency of spring flows necessary to inundate these areas. The decrease in the magnitude and frequency of spring flows necessary to inundate floodplain depressions is believed to be largely responsible for poor razorback sucker spawning success.

Biological Environment

Food supply, predation, and competition are important elements of the biological environment. Food supply is a function of nutrient supply and productivity, which could be limited by the presence of contaminants. The modification of flow regimes, water temperatures, sediment levels, and other habitat conditions caused by water depletions has contributed to the establishment of nonnative fishes. Predation and competition from nonnative fishes have been clearly implicated in the population reductions or elimination of native fishes in the Colorado River Basin (Dill 1944, Osmundson and Kaeding 1989, Behnke 1980, Joseph et al. 1977, Lanigan and Berry 1979, Minckley and Deacon 1968, Meffe 1985, Propst and Bestgen 1991, Rinne 1991, and others). Data collected by Osmundson and Kaeding (1991) indicated that during

low water years nonnative minnows capable of preying on or competing with larval endangered fishes greatly increased in numbers.

Nonnative fishes compete with native fishes in several ways. The capacity of a particular area to support aquatic life is limited by physical habitat conditions. Increasing the number of species in an area usually results in a smaller population of most species. The size of each species population is controlled by the ability of each life stage to compete for space and food resources and to avoid predation. Some nonnative fishes' life stages appear to have a greater ability to compete for space and food and to avoid predation in the existing altered habitat than do some native fishes' life stages.

Nonnative fishes are often stocked in and enter rivers from off-channel impoundments. The periodic introduction of these nonnative fishes into a river allows them to bypass limitations to reproduction, growth, or survival that they might encounter in the river. Consequently, populations of nonnative fishes in the river are enhanced. Endangered and other native species in the river experience greater competition and predation as a result.

Bald Eagle

The decline in eagle numbers is attributed to the loss of habitat; human disturbance; illegal shooting, poisoning, and trapping; electrocution; lead contamination of prey; and pesticide poisoning. Breeding and wintering habitat loss has been associated with land development and human activity (Snow 1973). Human activity near nest sites during the breeding season can result in nest abandonment and lowered reproductive success. Illegal hunting also reduces eagle numbers (USFWS 1986).

Electric power lines can pose a threat to bald eagles depending on the line's size and configuration (Steenhof 1978). Overall, bald eagle collisions with power lines appear to occur less frequently than electrocution. However, in specific areas where bald eagles congregate, transmission lines can represent a threat (USFWS 1986).

Secondary poisoning from eating lead-contaminated prey, particularly in wintering areas where eagles feed on crippled ducks and geese, and poisoned carcasses can reduce eagle numbers (USFWS 1986).

Historically, direct and indirect effects of organochlorine pesticides severely impacted bald eagle populations (Bailey 1984). However, a decreased use of these pesticides in North America has resulted in greater breeding

success for bald eagles (60 FR 36000). There is no critical habitat for the bald eagle in Colorado or New Mexico.

Peregrine Falcon

A number of factors have contributed to the decline of the peregrine falcon within the last century. The predominant factor was the thinning of eggshells due to pesticide poisoning. Other factors included egg collecting, shooting, human disturbance, and habitat loss. In particular, loss of riparian habitat can result in the direct reduction in prey availability (Herbert and Herbert 1965; Peakall 1974; Thelander 1978).

Historically, the marked decline in active peregrine eyries and nesting success in the United States have primarily been due to bioaccumulation of chemical residues and habitat loss. A metabolite of DDT (DDE) has been proven to cause eggshell thinning, although other chemicals and pesticides may affect reproductive efforts (USFWS 1984). Concentrations of DDT as low as 15 parts per million (ppm) can cause reproductive failure in breeding peregrines (Peakall 1974).

Due to the decreased use of these pesticides in North America, the breeding success has improved for a number of birds, including the peregrine falcon. Reintroduction (hacking) programs initiated throughout the United States and further protection of the individual birds and their habitat also have provided support for peregrine falcon populations. These improvements have led the Service to delist the arctic subspecies and the proposed delisting of the American subspecies; however, habitat loss and disturbance continue to be a factor in the recovery of this species. There is no critical habitat for the peregrine falcon in Colorado or New Mexico.

Mexican Spotted Owl

Mexican spotted owls have been impacted by logging, grazing, and fire management practices. There is currently no critical habitat for Mexican spotted owls.

Southwestern Willow Flycatcher

There have been impacts to riparian and wetland habitats southwestern willow flycatchers use from stream channelization, water management, invasion of exotic plant species and other things. Impacts to the birds themselves or their prey have occurred from invasion of brown-headed cowbirds and pesticide

spraying. Critical habitat for southwestern willow flycatchers was not designated in Colorado nor in New Mexico in the project area.

Uinta Basin Hookless Cactus

There have been impacts to the Uinta Basin hookless cactus in Colorado from road construction projects and other projects. There is no critical habitat for the Uinta Basin hookless cactus.

EFFECTS OF THE ACTION

Endangered Fishes

Water Quantity

The Project will cause a one time water depletion of 124 acre-feet to the Upper Colorado River Basin. The water will be used for hydrostatic testing of the pipeline and for dust suppression. The depletions will take place in Piceance Creek and Willow Creek in the White River subbasin; Roan Creek, the Colorado River, Plateau Creek and Cabin Reservoir in the Colorado River Basin; Kannah Creek and the Gunnison River in the Gunnison River subbasin; and the San Miguel River, Miramonte Reservoir, and the Dolores River in the Dolores River subbasin.

The potential effects of the water depletion proposed by the Project have been analyzed in the context of the ongoing Navajo Dam consultation and those commitments and agreements derived from the Animas-La Plata consultation. Of primary concern is the quantity of water provided to and through the habitat of the endangered Colorado squawfish and razorback sucker in the San Juan River. The amount of water depleted from the river's flow (21 acre-feet) by the proposed action is considered part of the 3,000 acre-foot cumulative annual depletion and should be reflected in water accounting for the San Juan River. The anticipated depletion of 57,100 acre-feet for the Animas-La Plata Project will not occur for an estimated 7 to 10 years; however, water depletions already occurring have created such a decline in the Colorado squawfish and razorback sucker that small additional depletions are considered jeopardy.

Water Quality

The Project's depletion would cause a proportionate decrease in dilution which in turn would cause a proportionate increase in heavy metal, selenium, salts, PAHs, pesticides, and other contaminant concentrations in the Colorado and San

Juan River Basins. An increase in contaminant concentrations in the river would likely result in an increase in the bioaccumulation of these contaminants in the food chain which could adversely affect the endangered fishes, particularly the predatory Colorado squawfish. Selenium is of particular concern due to its effects on fish reproduction and its tendency to concentrate in low velocity areas that are important habitats for Colorado squawfish and razorback suckers.

The increases in selenium concentrations caused by the Project, although very small, represent increases when baseline levels are already near or above the threshold level of 2 µg/L recommended by the Service.

Physical Habitat

High spring flows are very important for creating and maintaining complex channel geomorphology and suitable spawning substrates, creating and providing access to off-channel habitats, and possibly stimulating Colorado squawfish spawning migrations. Adequate summer and winter flows are important for providing a sufficient quantity of preferred habitats for a duration and at a frequency necessary to support all life stages of viable populations of all endangered fishes. To the extent that the Project will reduce flows, the ability of the rivers to provide these functions will be reduced.

Biological Environment

The modification of flow regimes, water temperatures, sediment levels, and other habitat conditions caused by water depletions has contributed to the establishment of nonnative fishes. To the extent that it would reduce flows and contribute to further habitat alteration, the Project would contribute to an increase in nonnative fish populations. Endangered fishes would experience increased competition and predation as a result.

Summary

The Service has concluded that the depletion of water caused by the Project will impact the primary constituent elements necessary for the survival and recovery of endangered fishes in the Upper Colorado and San Juan River Basins. Without actions taken to offset impacts, further flow reductions are likely to jeopardize the continued existence of the endangered fishes and adversely modify or destroy their critical habitat. The White, Colorado, Gunnison, Dolores and San Juan Rivers are essential components of the habitat of the endangered fishes and are important in ensuring survival of these species in

the event populations are lost in other subbasins as a result of catastrophic events such as oil spills.

Bald Eagle

The two winter communal roost sites, one winter concentration area discovered on the La Plata River in Colorado and New Mexico, and the winter concentration area on the Colorado River may be impacted by pipeline construction and maintenance activities (ENSR 1998). There are currently no known bald eagle nests within two miles of the pipeline route. Disturbance to roost and nest sites may lead to abandonment potentially affecting survival of individual bald eagles and may result in "take" as defined under the Endangered Species Act.

Peregrine Falcon

Disturbance to nesting falcons may cause abandonment affecting survival of individual falcons and may result in "take" under the Act.

Mexican Spotted Owl

Disturbance to nesting spotted owls may cause abandonment affecting survival of individual owls and may result in "take" under the Act.

Southwestern Willow Flycatcher

The proposed project would have both a short-term and a permanent effect. The short-term effect would result from construction-related disturbance to breeding flycatchers (e.g., noise associated with construction activities). Long-term, permanent impacts would result from the loss of riparian habitat. Because the southwestern willow flycatcher is a short-lived species, annual reproductive success and mortality are primary factors in population stability. Short-term effects, such as construction-related disturbance to breeding birds, could also have a sustained effect by reducing reproductive success and limiting recruitment back to the project area in subsequent years. Disturbance to the flycatchers may result in abandonment of nest sites and result in "take" under the Act.

Uinta Basin Hookless Cactus

There is expected to be approximately the same number of cactus (88) within the ROW as were counted in 1992. There is expected to be "take" by removing the cactus for transplant and for research purposes. The effect of the take

is expected to minimal as it only constitutes about 0.4 percent of the total population.

REASONABLE AND PRUDENT ALTERNATIVES

Regulations (50 CFR 402.02) implementing section 7 of the Act define reasonable and prudent alternatives as alternative actions, identified during formal consultation, that: (1) can be implemented in a manner consistent with the intended purpose of the action; (2) can be implemented consistent with the scope of the action agency's legal authority and jurisdiction; (3) are economically and technologically feasible; and (4) would, the Service believes, avoid the likelihood of jeopardizing the continued existence of listed species or resulting in the destruction or adverse modification of critical habitat.

Emergency maintenance in any critical habitat or important spawning, nesting, or roosting habitat for any of the species will require notification of the applicable land management agency, the Service, and the Colorado Division of Wildlife, or New Mexico Game and Fish Department.

Upper Colorado River Basin Endangered Fishes

On January 21-22, 1988, the Secretary of the Interior; the Governors of Wyoming, Colorado, and Utah; and the Administrator of the Western Area Power Administration were cosigners of a Cooperative Agreement to implement the "Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin" (U.S. Fish and Wildlife Service 1987). An objective of the Recovery Program was to recover the listed species while providing for new water development in the Upper Basin.

In order to further define and clarify processes outlined in sections 4.1.5, 4.1.6, and 5.3.4 of the Recovery Program, a Section 7 Agreement and a Recovery Implementation Program Recovery Action Plan was developed (U.S. Fish and Wildlife Service 1993). The Agreement establishes a framework for conducting all future section 7 consultations on depletion impacts related to new projects and all impacts associated with historic projects in the Upper Basin. Procedures outlined in the Agreement will be used to determine if sufficient progress is being accomplished in the recovery of the endangered fishes to enable the Recovery Program to serve as a reasonable and prudent alternative to avoid jeopardy. The Plan was finalized on October 15, 1993, and has been reviewed and updated annually.

In accordance with the Agreement, the Service assesses the impacts of projects that require section 7 consultation and determine if progress toward recovery has been sufficient for the Recovery Program to serve as a reasonable and prudent alternative. If sufficient progress is being achieved, biological opinions are written to identify activities and accomplishments of the Recovery Program that support it as a reasonable and prudent alternative. If sufficient progress in the recovery of the endangered fishes has not been achieved by the Recovery Program, actions from the Plan are identified which must be completed to avoid jeopardy to the endangered fishes. For historic projects, these actions serve as the reasonable and prudent alternative as long as they are completed according to the schedule identified in the Plan. For new projects, these actions serve as the reasonable and prudent alternative so long as they are completed before the impact of the project occurs.

In determining if sufficient progress has been achieved, the Service considers (a) actions which result in a measurable population response, a measurable improvement in habitat for the fishes, legal protection of flows needed for recovery, or a reduction in the threat of immediate extinction; (b) status of fish populations; (c) adequacy of flows; and (d) magnitude of the project impact. In addition, the Service considers support activities (funding, research, information and education, etc.) of the Recovery Program if they help achieve a measurable population response, a measurable improvement in habitat for the fishes, legal protection of flows needed for recovery, or a reduction in the threat of immediate extinction. The Service evaluates progress separately for the Colorado River and Green River subbasins; however, it gives due consideration to progress throughout the Upper Basin in evaluating progress toward recovery.

The following excerpts summarize portions of the Recovery Program that address depletion impacts, section 7 consultation, and project proponent responsibilities:

> "All future section 7 consultations completed after approval and implementation of this program (establishment of the Implementation Committee, provision of congressional funding, and initiation of the elements) will result in a one-time contribution to be paid to the Service by water project proponents in the amount of $10.00 per acre-foot based on the average annual depletion of the project . . . . This figure will be adjusted annually for inflation [the current figure is $13.81 per acre-foot] . . . . Concurrently with the completion of

> the Federal action which initiated the consultation, e.g., . . . issuance of a 404 permit, 10 percent of the total contribution will be provided. The balance . . . will be . . . due at the time the construction commences . . . ."

It is important to note that these provisions of the Recovery Program were based on appropriate legal protection of the instream flow needs of the endangered Colorado River fishes. The Recovery Program further states:

> ". . . it is necessary to protect and manage sufficient habitat to support self-sustaining populations of these species. One way to accomplish this is to provide long term protection of the habitat by acquiring or appropriating water rights to ensure instream flows . . . . Since this program sets in place a mechanism and a commitment to assure that the instream flows are protected under State law, the Service will consider these elements under section 7 consultation as offsetting project depletion impacts."

Thus, the Service has determined that depletion impacts, which the Service has consistently maintained are likely to jeopardize the listed fishes, can be offset by (a) the water project proponent's one-time contribution to the Recovery Program in the amount of $13.81 per acre-foot of the project's average annual depletion, (b) appropriate legal protection of instream flows pursuant to State law, and (c) accomplishment of activities necessary to recover the endangered fishes as specified under the Plan. The Service believes it is essential that protection of instream flows proceed expeditiously, before significant additional water depletions occur.

New Depletion

This Project's water depletions are considered new depletions in the Upper Colorado River Basin. New depletions in the Upper Colorado River Basin are those depletions that occur after January 22, 1988 when the Recovery Program was signed.

The Service has determined that, because the project's one time new depletion in the Upper Colorado River Basin of 124 acre-feet is below the current sufficient progress threshold of 3,000 acre-feet, the Recovery Program can serve as the reasonable and prudent alternative to avoid jeopardy to the Colorado squawfish, razorback sucker, humpback chub, and bonytail and

destruction or adverse modification of critical habitat caused by the project's new depletion.

With respect to the depletion charge described above, the applicant will make a one-time payment which has been calculated by multiplying the project's average annual new depletion (124 acre-feet) by the depletion charge in effect at the time payment is made. For Fiscal Year 1998 (October 1, 1997, to September 30, 1998), the depletion charge is $13.81 per acre-foot for the average annual depletion which equals a total payment of $1712.44 for this project. Ten percent of the total contribution ($171.24), or total payment, will be provided to the Service's designated agent, the National Fish and Wildlife Foundation, at the time of issuance of the Federal approvals from the Bureau of Land Management. The balance will be due at the time the construction commences. The payment will be included by the Bureau of Land Management as a permit stipulation. The amount payable will be adjusted annually for inflation on October 1 of each year based on the Consumer Price Index. The funds will be used for acquisition of water rights (or directly-related activities) to meet the instream flow needs of the endangered fishes; or, when recommended by the Implementation Committee, the funds will be used to support other recovery activities for the endangered fishes. All payments should be made to the Foundation.

National Fish and Wildlife Foundation
1120 Connecticut Avenue, N.W.
Suite 900
Washington, D.C. 20036

In a letter dated March 20, 1998, TransColorado agreed to this payment (Appendix A).

Each payment is to be accompanied by a cover letter that identifies the project and biological opinion number that requires the payment, the amount of payment enclosed, check number, and any special conditions identified in the biological opinion relative to disbursement or use of the funds (there are none in this instance). The cover letter also shall identify the name and address of the payor, the name and address of the Federal Agency responsible for authorizing the project, and the address of the Service office issuing the biological opinion. This information will be used by the Foundation to notify the payor, the lead Federal Agency, and the Service that payment has been received. The Foundation is to send notices of receipt to these entities within 5 working days of its receipt of payment.

To avoid adverse modification or destruction of critical habitat, construction will not be allowed during the Colorado squawfish spawning period (mid-June through mid-August) in the Gunnison and Colorado Rivers. A construction constraint period for the Gunnison River crossing will be required during the reintroduction period of the razorback sucker. This period typically extends from September into October, depending on the Service's release schedule. When considering both the razorback sucker and the Colorado squawfish, the construction period for the Gunnison crossing will be mid-August through mid-September, depending on the razorback's reintroduction schedule.

Additionally, to avoid adverse modification or destruction of critical habitat, native boulder rip-rap or other erosion control materials will not exceed the width of the permanent ROW disturbance area (50 feet) to allow for natural hydrogeomorphic processes to continue upstream and downstream of river crossings. If TransColorado's Clean Water Act section 404 permit directs a lesser width of linear footage of rip-rap, TransColorado will restrict the footage to that specified in the 404 permit.

San Juan River Basin Endangered Fishes

New depletions in the San Juan River Basin are currently defined as those depletions occurring after December 31, 1982. This cutoff date is consistent with the date used to derive the baseline for the Animas-La Plata Project Biological Opinions in 1991 and 1996. The proposed Animas-La Plata Project is the largest recent project that may impact the San Juan River Basin and; therefore, is driving section 7 consultation throughout the San Juan River Basin.

The biological opinion issued by Region 6 of the Service on February 26, 1996, for the Animas-La Plata Project found that the proposed development and subsequent depletion of 149,220 acre-feet of the San Juan River's flow would jeopardize the continued existence of the endangered Colorado squawfish and razorback sucker and adversely modify or destroy their critical habitat. A reasonable and prudent alternative which offsets jeopardy and adverse modification to critical habitat has been identified. The reasonable and prudent alternative includes: (1) an Animas-La Plata Project that results in an initial depletion of 57,100 acre-feet (Phase I, Stage A only), (2) research to determine endangered fish habitat needs, (3) operation of the Navajo Dam to provide a wide range of flow conditions for the endangered fish, including low winter flows, (4) a procedure to implement flow recommendations, (5) a commitment to release peak flows out of Navajo Dam as agreed upon with the Biology and Navajo Dam Operating Committees, (6) a guarantee that, based on the results of the research program and dependent upon the prevailing

hydrology. Navajo Dam will be operated for the life of the Animas-La Plata Project to mimic a natural hydrograph, and (7) legal protection for the reservoir releases instream to and through the endangered fish habitat to Lake Powell.

A Memorandum of Understanding and Supplemental Agreement to protect the releases made from Navajo Reservoir to and through the endangered fish habitat of the San Juan River to Lake Powell was signed in October 1991. The Memorandum of Understanding also states that future Federal actions resulting in minor depletions could occur up to a cumulative maximum depletion of 3,000 acre-feet per year. However, each of these minor depletions would be subject to section 7 consultation.

The Bureau of Reclamation, requested on July 30, 1991, formal consultation for reoperation of Navajo Dam. Reoperation of Navajo Dam is likely to help reverse the decline of the Colorado squawfish and razorback sucker, due in part to water depletion impacts. To avoid jeopardy to the Colorado squawfish and razorback sucker and to avoid destruction or adverse modification from the 21 acre-foot water depletion the Bureau of Reclamation, in consultation with the Service, will reoperate Navajo Dam to mimic the natural hydrograph of the San Juan River, as agreed to as a result of consultation on the Animas-La Plata Project. This operations agreement also will serve as the reasonable and prudent alternative to the Project.

The La Plata River crossing in New Mexico will be conducted during September 1-30 when flows are typically lowest and sediment transport is reduced. River bottom sediments at the La Plata crossing will be tested for potential metals contamination, depending on construction methods used. Testing protocols will be reviewed by the Service's New Mexico Field Office prior to implementation. Results will be made available to the New Mexico and Grand Junction Field Office for review and recommendations for further sampling of sediments prior to construction of any river crossing.

In New Mexico, hydrostatic test water will be analyzed for volatile organic compounds and metallic particles. Testing and treatment methods will be reviewed by the Service's New Mexico Field Office prior to any return of testing water to the rivers. Water quality samples will be collected when hydrostatic test water is being released to the river. If water quality is not sufficient to protect sensitive fish species, in accordance with state and federal guidelines, the agencies will coordinate with TransColorado to develop adequate mitigation measures to prevent impacts to fish from hydrostatic testing of the pipe.

CONSERVATION RECOMMENDATIONS

Bald Eagle

Bald eagle nest surveys will be conducted in spring 1998 within 1.0 miles of the ROW and access routes at all applicable river crossings.

If a bald eagle nest is found within 1.0 miles of the ROW or access routes the Service, Bureau of Land Management, and other appropriate land management agencies will be notified immediately. A bald eagle nest report will be submitted to the Service upon completion of surveys.

Construction will be restricted within 0.5 miles of bald eagle winter roost sites and concentration areas between November 15 and April 15. If a wintering bald eagle is observed perched within 0.5 miles of the construction area, prior to morning construction activities or during a break in construction, construction will be suspended until the eagle leaves on its own volition or the Bureau of Land Management, in consultation with the Service, determines that the potential for harassment is minimal.

Construction will be restricted within 1.0 miles of a bald eagle nest site from November 15 to July 31.

In New Mexico and Colorado any mature cottonwood trees removed in floodplain areas will be replaced at a 10:1 ratio (i.e. 10 saplings planted for each mature cottonwood removed).

Peregrine Falcon

Aerial surveys will be conducted in spring 1998 within one mile of the ROW to determine peregrine falcon nesting in that area.

If peregrine falcons are found within one mile of the ROW or access routes the Service, Bureau of Land Management, and other appropriate land management agencies will be notified. A peregrine falcon nest report will be submitted to the Service upon completion of surveys.

Construction will be restricted within one mile of a peregrine nest between March 15 and July 31.

Mexican Spotted Owl

A Mexican spotted owl survey will be conducted within 0.5 miles of the ROW in spring 1998 at all 14 suitable habitat sites as a follow-up to multiple 1997 surveys.

If Mexican spotted owls are found within 0.5 miles of the ROW or access routes the Service, Bureau of Land Management, and other appropriate land management agencies will be notified. A Mexican spotted owl survey report will be submitted to the Service upon completion of surveys.

Construction will be restricted within a minimum 600 acre Protected Activity Center that will be established if Mexican spotted owls are found to utilize the proposed ROW. There will be a construction restriction between February 1 and July 31 within the owl territories if any are discovered.

Southwestern Willow Flycatcher

Southwestern willow flycatcher surveys will be conducted in the spring and summer 1998 in all suitable habitat crossed by the proposed pipeline route.

No construction will take place within 0.25 miles of suitable southwestern willow flycatcher habitat until surveys have been completed.

If a southwestern willow flycatcher territory is found, the Service, Bureau of Land Management, and other appropriate land management agencies will be immediately contacted. A flycatcher survey report will be submitted to the Service upon completion of surveys.

If a flycatcher territory is found, the proposed pipeline will be rerouted around the habitat, unless a minimal amount of habitat, as determined by the Service, will be impacted. Even if the habitat impact at an occupied territory is minimal, no construction will take place between May 1 and August 15 within 0.25 miles of the habitat.

Willows will be successfully replaced on a 1:1 ratio in any suitable southwestern willow flycatcher habitat. Nonnative plants such as tamarisk and Russian olive will be removed and replaced successfully with willow in impacted habitat patches.

Uinta Basin Hookless Cactus

Uinta Basin hookless cactus surveys will be conducted during the flowering period in April and May 1998 in all suitable habitat crossed by the proposed pipeline route.

A Uinta Basin hookless cactus survey report will be submitted to the Service upon completion of surveys.

There will be no construction in the cactus areas from April 1 to June 30.

Occupied areas adjacent to the pipeline will be flagged and protected from construction equipment.

A qualified botanist will transplant all Uinta Basin hookless cactus within proposed disturbance areas in accordance with proven transplant methods.

Site specific protection measures will be implemented for transplant sites.

The transplanted cactus will be monitored for:

a. **Viability:** Measure the viability and reproductive vigor over a five year period in comparison to plants in adjacent undisturbed habitat.

b. **Habitat comparison:** Determine the success of transplanting into:

1. Undisturbed adjacent habitat (50 percent).

2. The back-filled trench (20 percent).

3. Unexcavated areas that had been covered by spoil material during construction (20 percent).

c. **Biologic research:** Ten percent (10 percent) of the cactus will be transplanted to the researchers home for biologic research to identify genetic markers used to assess genetic variability between populations, to assess growth rate, to assess seeding germination, and to assess mycorrhizal relationship.

INCIDENTAL TAKE

Section 9 of the Endangered Species Act, as amended, prohibits any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or

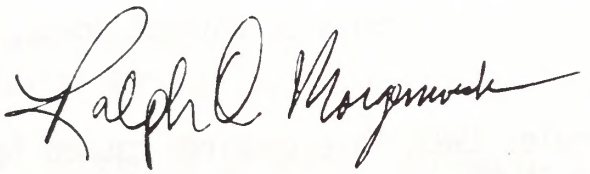
attempt to engage in any such conduct) of listed species without a special exemption. Under the terms of section 7(b)(4) and section 7(0)(2), taking that is incidental to and not intended as part of the agency action is not considered taking within the bounds of the Endangered Species Act, provided that such taking is in compliance with the incidental take statement.

The Service does not anticipate that the proposed action will result in any incidental take of the endangered fishes in the Upper Colorado River Basin or the San Juan River Basin. Furthermore, no incidental take is anticipated for the bald eagle, peregrine falcon, Mexican spotted owl, or southwestern willow flycatcher. Accordingly, no incidental take is authorized for these species. Should any take occur, the Bureau of Land Management must reinitiate formal consultation with the Service and provide detailed circumstances surrounding the take.

CONCLUSION

This concludes the Service's biological opinion on the impacts of the proposed project. This opinion was based upon the information described herein. If new information becomes available, if a new species becomes listed, if incidental take occurs, if the total average annual amount of water depleted by this project changes, or if any other project element changes which alters the operation of the project from that which is described in your correspondence and which may affect any endangered or threatened species in a manner or to an extent not considered in this biological opinion (see 50 CFR 402.16), formal section 7 consultation should be reinitiated. The Bureau of Land Management should condition its approval documents to retain jurisdiction should section 7 consultation need to be reinitiated.

Thank you for your cooperation in the formulation of this biological opinion and your interest in conserving endangered species.



REFERENCES

Anderson, R.J. and A.M. Bruce. 1980. Comparison of selected bald and golden eagle nests in western Washington. Pages 117-120 In Proceedings Washington Bald Eagle Symposium National Conservancy. Knight et al. (eds.). Seattle, Washington.

Archer, D.L., L.R. Kaeding, B.D. Burdick, and C.W. McAda. 1985. A study of the endangered fishes of the Upper Colorado River. Final Report - Cooperative Agreement 14-16-0006-82-959. U.S. Department of the Interior, Fish and Wildlife Service, Grand Junction, Colorado. 134 pp.

Archer, D.L., H.M. Tyus, and L.R. Kaeding. 1986. Colorado River fishes monitoring project, final report. U.S. Fish and Wildlife Service, Colorado River Fishery Project, Lakewood. 64 pp.

Barrows, C. 1981. Roost selection by spotted owls: An adaptation to heat stress. Condor. 83:302-309:1981.

Beck, D. L. 1980. Wintering bald eagles in the Wells Resource Area, Elko District, Nevada, 1979-1980. U.S. Department of the Interior, Bureau of Land Management. 46 pp.

Behnke, R.J., and D.E. Benson. 1983. Endangered and threatened fishes of the Upper Colorado River Basin. Ext. Serv. Bull. 503A, Colorado State University, Fort Collins. 38 pp.

Bent, A.C. 1960. Bent's Life Histories of North American Birds. Vol. II, Land Birds. Harper & Brothers, New York. 555 pp.

Bestgen, K.R. 1990. Status Review of the Razorback Sucker, (Xyrauchen texanus). Larval Fish Laboratory #44. Colorado State University, Ft. Collins.

Blake, E.R. 1953. Birds of Mexico. University of Chicago Press, Chicago, IL. 644 pp.

Brittingham, M.C. and S.A. Temple. 1983. Have cowbirds caused forest songbirds to decline? BioScience 33:31-35.

Brown, B.T. 1988. Breeding Ecology of a Willow Flycatcher Population in Grand Canyon, AZ. Western Birds 19:25-33.

Burdick, B.D. 1992. A plan to evaluate stocking to augment or restore razorback suckers in the upper Colorado River. U.S. Fish and Wildlife Service, Final Report, Grand Junction, Colorado. 56 pp.

Burdick, B. D. 1995. Ichthyofaunal studies of the Gunnison River, Colorado, 1992-1994. Final Report prepared for the Recovery Implementation Program for Endangered Fishes in the Upper Colorado River Basin. U.S. Fish and Wildlife Service, Colorado River Fishery Project, Grand Junction, Colorado. 60 pp + appendix.

Burdick, B.D. and L.R. Kaeding. 1985. Reproductive ecology of the humpback chub and the roundtail chub in the Upper Colorado River. Proceedings of the Annual Conference of Western Association of Game and Fish Agencies. 65:163 (abstract).

Cade, T.J. 1960. Ecology of the peregrine and gyrfalcon populations in Alaska. University of California Press. Zoology 63:151-290.

_____. 1975. Current status of the peregrine in North America. Pages 3-12 In J.R. Murphy, C.M. White, and B.E. Harrell, (eds.) Population status of raptors. Raptor Research No. 3.

Carlson, C.A., and R.T. Muth. 1989. The Colorado River: lifeline of the American Southwest. Pages 220-239 in D.P. Dodge, ed. Proceedings of the International Large River Symposium. Canadian Special Publication of Fisheries and Aquatic Sciences 106, Ottawa.

Carothers, S.W., R.R. Johnson, and S.W. Aitchison. 1974. Population structure and social organization of southwestern riparian birds. American Zoologist 14:97-108.

Cooksey, B.F., Jr. 1962. A winter population of the bald eagle (Haliaeetus leucocephalus) in northeastern Oklahoma. M.S. Thesis. Kansas State College of Pittsburgh. Pittsburgh, Kansas. 38 pp.

Dahl, T.E. 1990. Wetlands losses in the United States, 1780s to 1980s. USDI Fish and Wildlife Service, Washington, D.C. 13 pp.

Ellis, N.M. 1914. Fishes of Colorado. University of Colorado Studies. Vol. 11(1).

Enderson, J.H. and G.R. Craig. 1974. Status of the peregrine falcon in the Rocky Mountains in 1973. Auk 91(4):722-736.

ENSR Consulting and Engineering, Inc. 1998. TransColorado Gas Transmission Project 1998 bald eagle winter survey report. Rept. prepared by ENSR Consulting and Engineering, Ft. Collins, CO. 7 pp + appendix.

Federal Register. 1993. Endangered and threatened wildlife and plants: Final rule to list the Mexican spotted owl as a threatened species. Federal Register Vol. 58:14248-14271.

Federal Register. 1994. Endangered and threatened wildlife and plants: Removal of arctic peregrine falcon from the list of endangered and threatened wildlife. Federal Register Vol. 59:50796-50805.

Federal Register. 1995. Endangered and threatened wildlife and plants: Final rule to reclassify the bald eagle from endangered to threatened in all of the Lower 48 States. Federal Register Vol. 60:36000-36010.

Forsman, E.D., C.E. Meslow, and H.M. Wight. Distribution and biology of the spotted owl in Oregon. Wildlife Monographs. 87:1-64;1984.

Franzreb, K.E. 1987. Perspectives on managing riparian ecosystems for endangered bird species. Western Birds 18:3-9.

Fyfe, R.W., S.A. Temple, and T.J. Cade. 1976. The 1975 North American peregrine falcon survey. Canadian Field Naturalist. 90(3):228-273.

Ganey, J.L., J.A. Johnson, R.P. Balda, and R.W. Skaggs. 1988. Mexican spotted owl. Pp. 145-150 In Proceedings Southwest Raptor Management Symposium Workshop. R.L. Glinski, B.G. Pendleton, M.B. Moss, M.N. LeFranc, Jr., B.A. Millsap, and S.W. Hoffman, (eds.) National Wildlife Federation Scientific Technical Series No. 11.

Ganey, J.L. and R.P. Balda. 1985. Ecology of Mexican spotted owls in Arizona. USDA Forest Service, Reg. 3 Prog. Rep. 43-8167-4-550, Albuquerque, NM. 9 pp.

General Accounting Office. 1988. Public rangelands: Some riparian areas restored but widespread improvement will be slow. Report to Congressional Requesters GAO/RCED-88-105. U.S. General Accounting Office, Washington, D.C. 85 pp.

Gill, F.B. 1990. Ornithology. W.H. Freeman and Company, New York, New York. 660 pp.

Gorski, L.J. 1969. Traill's Flycatchers of the "fitz-bew" songform wintering in Panama. The Auk 86:745-747.

Grier, J.W., J.B. Elder, F.J. Gramlich, N.F. Green, J.V. Kussman, J.E. Mathisen, and J.P. Mattsson. 1983. Northern States bald eagle recovery plan. 76 pp.

Griffith, J.T. and J.C. Griffith. 1994. 1994 brown-headed cowbird removal program on Marine Corps Base Camp Pendleton, California. Final Report October 18, 1994. P.O. NO. M00-681-M4840. Griffith Wildlife Biology, Calumet, Michigan.

Grubb, T.G. 1976. A survey and analysis of bald eagle nesting in western Washington. M.S. Thesis. University of Washington. Seattle, Washington. 87 pp.

Grubb, T.G. and C.E. Kennedy. 1982. Bald eagle winter habitat on southwestern National Forests. U.S. Forest Service, Rocky Mountain Forest and Range Experiment Station. Research Paper RM-237. 13 pp.

Grubb, T.G. and R.J. Hansel. 1978. Food habits of nesting bald eagles on Kodiak Island, Alaska. The Murrelet 59:70-72.

Gutermouth, F. B., L. D. Lentsch, and K. R. Bestgen. 1994. Collection of Age-0 Razorback Suckers (Xyrauchen texanus) in the Lower Green River, Utah. Southwestern Nat., 39 (4).

Hamman, R.L. 1981. Spawning and culture of Colorado squawfish (Ptychocheilus lucius) in a raceway. In Miller et al. Colorado River Fishery Project Final Report.

Harrison, H.H. 1979. A field guide to western birds' nests of 520 species found breeding in the United States west of the Mississippi River. Houghton Mifflin Company, Boston, Massachusetts. 279 pp.

Harvey, M.D., R.A. Mussetter, and E.J. Wick. 1993. A Physical Process-biological response model for spawning habitat formation for the endangered Colorado squawfish. Rivers. 4 (2):114-131.

Haynam, K.C. and J.S. Sumner. 1977. Peregrine and prairie falcon nesting survey and habitat analysis - Lolo National Forest. U.S. Forest Service Contract No. 263-0046.

Haynes, C.M., T.A. Lytle, E.J. Wick, and R.T. Muth. 1984. Larval Colorado squawfish (Ptychocheilus lucius Girard) in the Upper Colorado River Basin, Colorado, 1979-81. Southwestern Naturalist 29:21-33.

Haynes, C.M., R.T. Muth, and T.P. Nesler. 1985. Identification of habitat requirements and limiting factors for Colorado squawfish and humpback chub. Final Report, Federal Aid in Fish and Wildlife Restoration, Project SE-3-4. Colorado Division of Wildlife, Denver. 62 pp.

Heil, K.H. and M. Porter. 1987. A taxonomic evaluation of Sclerocactus glaucus and its relationship to Sclerocactus parviflorus, conducted for the U.S. Fish and Wildlife Service. Farmington, NM 37pp.

Herbert, R.A. and K.G.S. Herbert. 1965. Behavior of peregrine falcons in the New York City region. Auk 82:62-94.

Holden, P.B. and C.B. Stalnaker. 1970. Systematic studies of the cyprinid genus Gila in the Upper Colorado River Basin. Copeia 1970(3):409-420.

Holden, P.B., and C.B. Stalnaker. 1975. Distribution and abundance of mainstream fishes of the middle and upper Colorado River basins, 1967-1973. Transactions of the American Fisheries Society 104(2):217-231.

Holden, P.B. and C.B. Stalnaker. 1975b. Distribution of fishes in the Dolores and Yampa River systems of the Upper Colorado Basin. Southwestern Naturalist 19:403-412.

Hubbard, J.P. 1987. The Status of the Willow Flycatcher in New Mexico. Endangered Species Program, New Mexico Department of Game and Fish, Santa Fe, New Mexico. 29 pp.

Ingram, N. 1965. Wintering bald eagles at Guttenberg, Iowa and Cassville, Wisconsin. 1964, 1965. Iowa Bird Life 35(3):66-78.

Johnson, C.L. 1997. Distribution, habitat, and ecology of the Mexican spotted owl in Colorado. Published Master of Arts Thesis, University of Northern Colorado, December 1997.

Johnson, C.L. and R.T. Reynolds. 1996. Responses of Mexican spotted owls to military fixed-wing overflights. USDA Forest Service. Rocky Mountain Forest and Range Experimental Station. 12pp.

Johnson, R.R. and L.T. Haight. 1984. Riparian problems and initiatives in the American Southwest: A regional perspective Pages 404-412, in R.E. Warner and K.M. Hendrix eds. California riparian systems: Ecology, conservation, and productive management. University of California Press, Berkeley, California.

Johnson, R.R., L.T. Haight, and J.M. Simpson. 1987. Endangered habitats versus endangered species: a management challenge. Western Birds 18:89-96.

Jordan, D.S. 1891. Report of explorations in Colorado and Utah during the summer of 1889 with an account of the fishes found in each of the river basins examined. Bulletin of the United States Fish Commission 9:24.

Jordan, D.S. and B.W. Evermann. 1896. The fishes of North and Middle America. Bulletin U.S. National Museum 47 (1):1240.

Joseph, T.W., J.A. Sinning, R.J. Behnke, and P.B. Holden. 1977. An evaluation of the status, life history, and habitat requirements of endangered and threatened fishes of the upper Colorado River system. U.S. Fish and Wildlife Service, Office of Biological Services, Fort Collins, Colorado, FWS/OBS 24, Part 2:183.

Kaeding, L.R., B.D. Burdick, P.A. Schrader, and C.W. McAda. 1990. Temporal and Spatial Relations between the Spawning of Humpback Chub and Roundtail Chub in the Upper Colorado River. Trans. Am. Fish Soc. 119:135-144.

Kaeding, L.R., B.D. Burdick, P.A. Schrader, and W.R. Noonan. 1986. Recent capture of a bonytail chub (Gila elegans) and observations on this nearly extinct cyprinid from the Colorado River. Copeia 1986(4):1021-1023.

Kaeding, L.R., and D.B. Osmundson. 1989. Biologically defensible flow recommendations for the maintenance and enhancement of Colorado squawfish habitat in the "15-mile" reach of the upper Colorado River during July, August, and September. U.S. Fish and Wildlife Service, Grand Junction, Colorado. 169 pp.

Karp, C.A. and H.M. Tyus. 1990. Humpback chub (Gila Cypha) in the Yampa and Green Rivers with observations on other sympatric fishes. great Basin Naturalist 50:257-264.

Katibah, E.F. 1984. A brief history of riparian forests in the Central Valley of California. Pages 23-29, in R.E. Warner and K.M. Hendrix eds. California Riparian Systems: Ecology, Conservation, and Productive Management. University of California Press, Berkeley, California.

Kidd, G. 1977. An investigation of endangered and threatened fish species in upper Colorado River as related to Bureau of Reclamation Projects. Final Report, Bureau of Reclamation, Salt Lake City, Utah. 36 pp.

King, J.R. 1955. Notes on the life history of Traill's Flycatcher (Empidonax traillii) in southeastern Washington. The Auk 72:148-173.

Lanigan, S.H., and H.M. Tyus. 1989. Population size and status of the razorback sucker in the Green River basin, Utah and Colorado. North American Journal of Fisheries Management 9:1.

Laymon, S.A. 1985. General habitats and movements of spotted owls in the Sierra Nevada. Pp. 66-68 In Ecology and Management of the Spotted Owl in the Pacific Northwest. R. J. Guiterrez and A.B. Carey, (tech. eds.) USDA Forest Service Gen. Rep. PNW-185. 119 pp.

Ligon, J.S. 1961. New Mexico Birds and where to find them. The University of New Mexico Press, Albuquerque, New Mexico.

Lish, J.W. 1975. Status and ecology of bald eagles and nesting of golden eagles in Oklahoma. M.S. Thesis. Oklahoma State University, Stillwater. 98 pp.

Lish, J.W. and J.C. Lewis. 1975. Status and ecology of bald eagles wintering in Oklahoma. Proceedings of the Southeastern Association of Game and Fish Commission 29:415-423.

Marsh, P.C., and W.L. Minckley. 1989. Observations on recruitment and ecology of razorback sucker: lower Colorado River, Arizona-California. Great Basin Naturalist 49(1):71-78.

Mayfield, H. 1977. Brown-headed cowbird: agent of extermination? American Birds 31:107-113.

Maynard, W.R. 1995. Summary of 1994 survey efforts in New Mexico for southwestern willow flycatcher (Empidonax traillii extimus). Contract # 94-516-69. New Mexico Department of Game and Fish, Sante Fe, New Mexico. 48 pp.

McAda, C.W. 1987. Status of the razorback sucker (Xyrauchen texanus) in the Colorado River upstream from Lake Powell. Proceedings of the Desert Fishes Council 17(1985):185.

McAda, C.W. and Kaeding. 1989. Relations between maximum-annual river discharge and the relative abundance of age-0 Colorado squawfish and other fishes in the upper Colorado River. Final report. U.S. Fish and Wildlife Service, Colorado River Fishery Project. Grand Junction, Colorado. 25pp.

McAda, C.W., and R.S. Wydoski. 1980. The razorback sucker, (Xyrauchen texanus), in the upper Colorado River basin, 1974-76. U.S. Fish and Wildlife Service Technical Paper 99. 50 pp.

McCabe, R.A. 1991. The little green bird: ecology of the willow flycatcher. Palmer Publications, Inc., Amherst, Wisconsin. 171 pp.

McCarthy, C.W., and W.L. Minckley. 1987. Age estimation for razorback sucker (Pisces: Catostomidae) from Lake Mohave, Arizona and Nevada. Journal Arizona-Nevada Academy of Science 21:87-97.

McGeen, D.S. 1972. Cowbird-host relationships. The Auk 89:360-380.

Milhous, R.T. 1982. Effect of sediment transport and flow regulation on the ecology of gravel-bed rivers. In Hey, R.D., J.C. Bathwist, and C.R. Thorne, eds. Gravel-bed rivers. John Wiley and Sons, New York.

Miller, R.R. 1946. Gila cypha, a remarkable new species of cyprinid fish from the Colorado River in Grand Canyon, Arizona. Journal of the Washington Academy of Science 36(12):409-415.

Miller, R.R. 1958. Origin and affinities of the freshwater fish fauna of western North America. Pages 187-222 In C.L. Hubbs, editor. Zoogeography. American Association for the Advancement of Science, Publication 51.

Miller, R.R. 1961. Man and the changing fish fauna of the American Southwest. Papers of the Michigan Academy of Science, Arts, and Letters 46:365-404.

Miller, W.H., J.J. Valentine, D.L. Archer, H.M. Tyus, R.A. Valdez, and L.R. Kaeding. 1982. Colorado River Fishery Project Final Report Summary. U.S. Fish and Wildlife Service, Salt Lake City, Utah. 42 pp.

Miller, W.H., L.R. Kaeding, H.M. Tyus, C.W. McAda, and B.D. Burdick. 1984. Windy Gap Fishes Study. U.S. Department of the Interior, Fish and Wildlife Service, Salt Lake City, Utah. 37 pp.

Minckley, W. L. 1973. Fishes of Arizona. Arizona Game and Fish Department, Phoenix. 293 pp.

Minckley, W.L., D.A. Hendrickson, and C.E. Bond. 1986. Geography of Western North America Freshwater Fishes: Description and Relationships to Intracontinental Tectonism. pp 519-613 In: C.H. Hocutt and E.O. Wiley (eds.). The Zoogeography of North American Freshwater Fishes. Wiley-Interscience, New York, New York.

Minckley, W.L. 1983. Status of the razorback sucker, (Xyrauchen texanus) (Abbott), in the lower Colorado River basin. Southwestern Naturalist 28(2):165-187.

Modde, T. 1996. Juvenile razorback sucker (Xyrauchen texanus) in a managed wetland adjacent to the Green River. Great Basin Naturalist 56:375-376.

Muth, R.T. 1995. Conceptual-framework document for development of a standardized monitoring program for basin-wide evaluation of restoration activities for razorback sucker in the Green and Upper Colorado river systems. Colorado State University Larval Fish Laboratory final report to the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin, Denver, Colorado.

Muiznieks, B.D., T.E. Corman, S.J. Sferra, M.K. Sogge, and T.J. Tibbitts. 1994. Arizona Partners In Flight 1993 southwestern willow flycatcher survey. Technical Report 52. Arizona Game and Fish Department, Nongame and Endangered Wildlife Program, Phoenix, Arizona. 25 pp.

O'Brien, J.S. 1984. 1983 Yampa River cobble reach morphology investigation. Final Report. U.S. Fish and Wildlife Service, Denver, Colorado. 79 pp.

Osmundson, D.B., and L.R. Kaeding. 1989. Studies of Colorado squawfish and razorback sucker use of the "15-mile reach" of the Upper Colorado River as part of conservation measures for the Green Mountain and Ruedi Reservoir water sales. Final Report. U.S. Fish and Wildlife Service, Grand Junction, Colorado.

Osmundson, D.B., and L.R. Kaeding. 1991. Flow recommendations for maintenance and enhancement of rare fish habitat in the 15-mile reach during October-June. Final Report. U.S. Fish and Wildlife Service, Grand Junction, Colorado.

Parker, D. and T. Hull. 1994. The Gila Valley Revisited. Results of a 1994 survey of willow flycatchers found along the Gila River Gila, Gila and Cliff, Grant County New Mexico. Applied Ecosystem Management, Flagstaff, Arizona. 29 pp.

Peakall, D.B. 1974. DDE: Its presence in peregrine eggs in 1948. Science 183:673-674.

Peterson, R.T. 1990. A field guide to western birds. 3rd ed. Houghton Mifflin Company, Boston, Massachusetts. 432 pp.

Peterson, R.T. and E. Chalif. 1973. A field guide to Mexican birds. Houghton Mifflin Company, Boston, Massachusetts. 432 pp.

Phillips, A., J. Marshall, and G. Monson. 1964. The birds of Arizona. University of Arizona Press, Tucson, Arizona. 212 pp.

Phillips, A.R. 1948. Geographic variation in Empidonax traillii. The Auk 65:507-514.

Platania, S.P. 1990. Biological summary of the 1987 to 1989 New Mexico-Utah ichthyofaunal study of the San Juan River. Unpublished report to the New Mexico Department of Game and Fish, Santa Fe, and the U.S. Bureau of Reclamation, Salt Lake City, Utah, Cooperative Agreement 7-FC-40-05060.

Platania, S.P., and D.A. Young. 1989. A Survey of the Icthyofauna of the San Juan and Animas Rivers from Archuleta and Cedar Hill (respectively) to their Confluence at Farmington, New Mexico. Department of Biology, University of New Mexico, Albuquerque.

Porter, R.D. and C.M. White. 1973. The peregrine falcon in Utah, emphasizing ecology and competition with the prairie falcon. Brigham Young University Scientific Bulletin. Biological Series 18(1):1-74.

Rea, A.M. 1983. Once a river: bird life and habitat changes on the middle Gila. University of Arizona Press, Tucson, Arizona. 285 pp.

Reynolds, R.T. and C.L. Johnson. 1994. Distribution and ecology of the Mexican spotted owl in Colorado: Annual Report. USDA Forest Service. Rocky Mountain Forest and Range Experimental Station. 17pp.

Ridgely, R.S. and G. Tudor. 1994. The Birds of South America: Suboscine Passerines. University of Texas Press, Austin, Texas. xxx pp.

Sedgwick, J.A. and F.L. Knopf. 1992. Describing willow flycatcher habitats: scale perspectives and gender differences. The Condor 94:720-733.

Seethaler, K. 1978. Life history and ecology of the Colorado Squawfish (Ptychocheilus lucius) in the upper Colorado River basin. Thesis, Utah State University, Logan.

Sferra, S.J., R.A. Meyer, and T.E. Corman. 1995. Arizona Partners In Flight 1994 southwestern willow flycatcher survey. Final Technical Report 69. Arizona Game and Fish Department, Nongame and Endangered Wildlife Program, Phoenix, Arizona. 46 pp.

Shickley, G.M. 1961. Wintering bald eagles in Nebraska, 1959-1960. Nebraska Bird Review 29:26-31.

Sigler, W.F. and R.R. Miller. 1963. Fishes of Utah. Utah Department of Fish and Game, Salt Lake City. 203 pp.

Smith, G.R. 1960. Annotated list of fish of the Flaming Gorge Reservoir Basin, 1959. Pages 163-268 in R.M. Woodbury, ed. Ecological Studies of the Flora and Fauna of Flaming Gorge Reservoir Basin, Utah and Wyoming. Department of Anthropology, University of Utah, Salt Lake City. Anthropological Paper Number 48, Series Number 3.

Snow, C. 1973. Technical note: Habitat management series for endangered species. U.S.D.I. Bureau of Land Management; Report No. 5. Southern Bald Eagle (Haliaeetus leucocephalus leucocephalus) and Northern Bald Eagle (Haliaeetus leucocephalus alascanus). 58 pp.

Sogge, M.K. 1995b. Southwestern willow flycatcher surveys along the San Juan River, 1994 - 1995. Final report to the Bureau of Land Management, San Juan Resource Area. National Biological Service Colorado Plateau Research Station/Northern Arizona University, Flagstaff, Arizona. 27 pp.

Sogge, M.K. 1995c. Southwestern willow flycatchers in the Grand Canyon. Pages 89-91, in E.T. LaRoe, G.S. Farris, C.E. Puckett, P.D. Doran, and M.J. Mac eds. Our living resources: a report to the nation on the distribution, abundance, and health of U.S. plants, animals, and ecosystems. Department of the Interior, National Biological Service, Washington, DC.

Sogge, M.K. and T.J. Tibbitts. 1992. Southwestern willow flycatcher (Empidonax traillii extimus) surveys along the Colorado River in Grand Canyon National Park and Glen Canyon National Recreation Area. National Park Service Cooperative Park Studies Unit/Northern Arizona University, Flagstaff, Arizona. 43 pp.

Sogge, M.K. and T.J. Tibbitts. 1994. Distribution and status of the southwestern willow flycatcher along the Colorado river in the Grand Canyon - 1994. Summary Report. National Biological Survey Colorado Plateau Research Station/Northern Arizona University, Flagstaff, Arizona. 37 pp.

Sogge, M.K., T.J. Tibbitts, and S.J. Sferra. 1993. Status of the southwestern willow flycatcher along the Colorado River between Glen Canyon Dam and Lake Mead - 1993. Summary Report. National Park Service Cooperative Park Studies Unit/Northern Arizona University, U.S. Fish and Wildlife Service, and Arizona Game and Fish Department., Flagstaff, Arizona. 69 pp.

Solis, D.M. Jr. 1984. Summer habitat ecology of radio-tagged spotted owls on Six Rivers National Forest. California. M.S. Thesis, Humboldt State Univ. Arcata, CA. 168 pp.

Spencer, D.A. 1976. Wintering of the migrant bald eagle in the Lower 48 States. National Agricultural Chemicals Association. Washington, D.C. 170 pp.

Stalmaster, M.V. and J.R. Newman. 1979. Perch site preference of wintering bald eagles in Northwest Washington. Journal of Wildlife Management 73(1):221-224.

State of Arizona. 1990. Final report and recommendations of the Governor's riparian habitat task force (October 1990). Executive Order 89-16. Streams and Riparian Resources. Governor's Riparian Habitat Task Force, Phoenix, Arizona. 28 pp.

Steenhof, K. 1976. The ecology of wintering bald eagles in southeastern South Dakota. M.S. Thesis. University of Missouri, Columbia, Missouri. 148 pp.

Stiles, F.G. and A.F. Skutch. 1989. A guide to the birds of Costa Rica. Comstock, Ithaca, New York. 364 pp.

Szaro, R.C. 1989. Riparian forest and scrubland community types of Arizona and New Mexico. Desert Plants 9:70-138.

Taba, S.S., J.R. Murphy, and H.H. Frost. 1965. Notes on the fishes of the Colorado River near Moab, Utah. Proceedings of the Utah Academy of Sciences, Arts, and Letters 42(2):280-283.

Thelander, C.G. 1978. The status of the peregrine falcons in California - past and resent. Pages 3-12 In Proceedings of the National Audubon Society Symposium on the Current Status of Peregrine Falcon Populations in North America. P. P. Schaeffer and S. M. Ehlers, (eds.)

Tibbitts, T.J., M.K. Sogge, and S.J. Sferra. 1994. A survey protocol for the southwestern willow flycatcher (Empidonax traillii extimus). Technical Report NPS/NAUCPRS/NRTR-94/04. National Park Service Colorado Plateau Research Station, Flagstaff, Arizona. 24 pp.

Tyus, H.M. 1990. Potamodromy and reproduction of Colorado Squawfish Ptyochocheilus lucius. Transactions of the American Fisheries Society 119:1,035-1,047.

Tyus, H.M. 1985. Homing behavior noted for Colorado squawfish. Copeia 1985: 213-215.

Tyus, H.M. 1987. Distribution, reproduction, and habitat use of the razorback sucker in the Green River, Utah, 1979-1986. Transactions of the American Fisheries Society 116:111-116.

Tyus, H.M., and C.A. Karp. 1989. Habitat Use and Streamflow Needs of Rare and Endangered Fishes, Yampa River, Colorado. U.S. Fish and Wildlife Service, Biology Report 89(14). 27 pp.

Tyus, H.M., and C.A. Karp. 1990. Spawning and movements of razorback sucker, (Xyrauchen texanus), in the Green River basin of Colorado and Utah. Southwestern Naturalist 35: 427-433.

Tyus, H.M. and C.W. McAda. 1984. Migration, movements and habitat preferences of Colorado squawfish, Ptychocheilus lucius, in the Green, White, and Yampa Rivers, Colorado and Utah. Southwestern Naturalist 29:289-299.

Tyus, H.M., B.D. Burdick, R.A. Valdez, C.M. Haynes, T.A. Lytle, and C.R. Berry. 1982. Fishes of the Upper Colorado River Basin: Distribution, abundance and status. Pages 12-70 in Miller, W.H., H.M. Tyus and C.A. Carlson, eds. Fishes of the Upper Colorado River System: Present and Future. Western Division, American Fisheries Society, Bethesda, Maryland.

Unitt, P. 1987. Empidonax traillii extimus: An endangered subspecies. Western Birds 18:137-162.

U.S. Bureau of Land Management. 1998. Biological assessment for the TransColorado Gas Transmission Project. 92pp + appendices.

U.S. Fish and Wildlife Service. 1982. Colorado River Fishery Project Final Report. Part I (42 pp.), Part II (356 pp.), and Part III (342 pp.). Prepared for the U.S. Bureau of Reclamation, Salt Lake City, Utah. April 1982.

U.S. Fish and Wildlife Service. 1984. American peregrine falcon recovery plan (Rocky Mountain/Southwest Population). Prepared in cooperation with the American Peregrine Falcon Recovery Team. Denver, Colorado.

U.S. Fish and Wildlife Service. 1984. Rare and Endangered Colorado River Fishes Sensitive Areas: a Report to the Upper Colorado River Basin Coordination Committee by the Upper Basin Biological Subcommittee. 23 pp.

U.S. Fish and Wildlife Service. 1986. Annual report to the Bureau of Reclamation: Colorado River endangered fishes investigations. U.S. Department of the Interior, Fish and Wildlife Service, Division of Endangered Species, Denver, Colorado.

U.S. Fish and Wildlife Service. 1986. Recovery plan for the Pacific bald eagle. U.S. Fish and Wildlife Service, Portland, Oregon. 160 pp.

U.S. Fish and Wildlife Service. 1987. Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin. U.S. Fish and Wildlife Service, Denver, Colorado. 82 pp.

U.S. Fish and Wildlife Service. 1990 b. Humpback Chub Recovery Plan. U.S. Fish and Wildlife Service, Denver, Colorado. 43 pp.

U.S. Fish and Wildlife Service. 1990 b. Humpback Chub Recovery Plan. U.S. Fish and Wildlife Service, Denver, Colorado. 43 pp.

U.S. Fish and Wildlife Service. 1993. Section 7 Consultation, Sufficient Progress, and Historic Projects Agreement and Recovery Action Plan, Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin. U.S. Fish and Wildlife Service, Denver, Colorado. 50 pp.

U.S. Fish and Wildlife Service. 1995a. Final rule determining endangered status for the southwestern willow flycatcher. Federal Register 60:10694-10715.

U.S. Fish and Wildlife Service. 1995b. Recovery plan for the Mexican spotted owl (Strix occidentalis lucida): Vol. I. Albuquerque, New Mexico. 172 pp.

_____. 1995c. Endangered and threatened wildlife and plants; Determination of critical habitat for the Mexican spotted owl. Final Rule. Federal Register Vol. 60, No. 108:29914-29951.

Valdez, R.A. 1990. The Endangered Fish of Cataract Canyon. Final Report prepared for the United States Department of Interior, Bureau of Reclamation, Salt Lake City, Utah. Contract No. 6-CS-40--3980, Fisheries Biology and Rafting. BIO/WEST Report No. 134-3. 94 pp + appendices.

Valdez, R.A., P.B. Holden, and T.B. Hardy. 1990. Habitat Suitability Index curves for humpback chub of the upper Colorado River Basin. Rivers 1:31-42.

Valdez, R.A., P.G. Mangan, R.P. Smith, and B.C. Nilson. 1982. Upper Colorado River investigation (Rifle, Colorado to Lake Powell, Utah). U.S. Fish and Wildlife Service and Bureau of Reclamation, Final Report, Part 2, Colorado River Fishery Project, Salt Lake City, Utah.

Valdez, R.A. and G.H. Clemmer. 1982. Life History and prospects for recovery of the humpback and bonytail chub. Pages 109-119 in W.M. Miller, H.M. Tyus and C.A. Carlson, eds. Proceedings of a Symposium on Fishes of the Upper Colorado River System: Present and Future. American Fisheries Society, Bethesda, Maryland.

Valdez, R.A., and W.J. Masslich. 1989. Winter habitat study of endangered fish-Green River. Wintertime movement and habitat of adult Colorado squawfish and razorback suckers. Report No. 136.2. BIO/WEST Inc., Logan, Utah. 178 pp. 178 pp.

Van Steeter, M.M. 1996. Historic and current processes affecting channel change and endangered fish habitats of the Colorado River near Grand Junction, Colorado. Ph.D. Thesis. University of Colorado. 180 pp.

Vanicek, C. D. 1967. Ecological studies of native Green River fishes below Flaming Gorge dam, 1964-1966. Ph.D. Dissertation. Utah State University. 124 pp.

Vanicek, C.D., and R.H. Kramer. 1969. Life history of the Colorado squawfish (Ptychocheilus lucius) and the Colorado chub (Gila robusta) in the Green River in Dinosaur National Monument, 1964-1966. Transactions of the American Fisheries Society 98(2):193.

Vanicek, C. D., R. H. Kramer, and D. R. Franklin. 1970. Distribution of Green River fishes in Utah and Colorado following closure of Flaming Gorge dam. Southwestern Naturalist 14:297-315.

Vian, W.E. 1971. The wintering bald eagle (Haliaeetus leucocephalus) on the Platte River in south-central Nebraska. M.S. Thesis, Kearney State College, Kearney, Nebraska. 60 pp.

Walkinshaw, L.H. 1966. Summer biology of Traill's flycatcher. Wilson Bulletin 78:31-46.

Welsh, S.L., N.D. Atwood, S. Goodrich, and L.C. Higgins. 1993. A Utah Flora. Second ed. rev., Brigham Young University, Provo, Utah. 986 pp.

Wheelock, I.G. 1912. Birds of California: an introduction to more than three hundred common birds of the state and adjacent islands. A.C. McClurg and Company, Chicago, Illinois

Whitfield, M.J. 1990. Willow flycatcher reproductive response to brown-headed cowbird parasitism. Masters Thesis, California State University, Chico, California State University, Chico, California.

Whitfield, M.J. 1993. Brown-headed cowbird control program and monitoring for willow flycatchers, South Fork Kern River, California. Draft report to California Department of Fish and Game, Contract #FG 2285., Weldon, California. 11 pp.

Wick, E.J., J.A. Hawkins and C.A. Carlson. 1985. Colorado squawfish population and habitat monitoring 1983-1984. Final Report SE-3-7. Colorado Division of Wildlife and Colorado State University, Larval Fish Laboratory, Fort Collins. 48 pp.

Wick, E.J., T.A. Lytle, and C.M. Haynes. 1981. Colorado squawfish and humpback chub population and habitat monitoring, 1979-1980. Progress Report, Endangered Wildlife Investigations. SE-3-3. Colorado Division of Wildlife, Denver. 156 pp.

Wick, E.J., D.E. Snyder, D. Langlois, and T. Lytle. 1979. Colorado squawfish and humpback chub population and habitat monitoring. Federal Aid to Endangered Wildlife Job Progress Report. SE-3-2. Colorado Division of Wildlife, Denver, Colorado. 56 pp. + appendices.

Willard, F.C. 1912. A week afield in southern Arizona. The Condor 14:53-63.

TransColorado
Gas Transmission Company

March 20, 1998

Terry Ireland
U.S. Fish and Wildlife Service - Ecological Services
Western Colorado Office
764 Horizon Drive, South Annex A
Grand Junction, Colorado 81506-3946

RECEIVED
MAR 24 1998
ECOLOGICAL SERVICES
GRAND JUNCTION CO 81506

Re: TransColorado Pipeline

Dear Terry:

TransColorado Gas Transmission Company (TransColorado) plans to construct Phase II of the TransColorado Pipeline during the summer/fall of 1998. Phase II consists of a 272-mile pipeline from the Piceance Basin near Meeker, Colorado to an interconnect with Phase I north of Bloomfield, New Mexico. As indicating in your phone mail message on March 18, 1998, the U.S. Fish and Wildlife Service (Service) is preparing an updated biological opinion for the TransColorado pipeline project.

TransColorado will be acquiring water from the Colorado River Basin for dust abatement and hydrostatic testing. The total estimated depletion in the Colorado River Basin will be 124 acre-feet. Water depletions in the Upper Colorado River Basin have been recognized as a source of impact to endangered fish species.

The Service has determined that the TransColorado pipeline project depletion impacts can be offset by a one-time contribution to the recovery implementation program for endangered fish species in the Upper Colorado River Basin in the amount of $13.81 per acre foot. Accordingly, TransColorado agrees to make a total contribution in the amount of $1712.44 at the time construction commences.

If you have any questions, please contact me at (801) 324-3802.

Cordially yours,

David C. Flaim

David C. Flaim

Mailing Address:
PO Box 11450
Salt Lake City, UT 84147

Phone: (801) 324-2400
Fax: (801) 324-2684

Street Address:
79 S. State Street
Salt Lake City, UT 84111

ATTACHMENT 4

Potential Impacts and Applicable Mitigation for BLM and USFS Sensitive Species Identified for the TransColorado Gas Transmission Project

Species Name	Land Management Unit					Determination[2]	Recommended Mitigation
	National Forest		BLM				
	GMUG	San Juan	Colorado	Farmington, NM	Residence[1]		
MAMMALS							
Kit fox (*Vulpes macrotis*)			X		YR	2	Survey for active dens. If active dens are found, buffer zones and construction constraint periods will be coordinated with the jurisdictional agencies.
BIRDS							
Northern goshawk (*Accipiter gentilis*)	X	X	X		YR	2	Survey for nest sites in previously occupied territories. If active nests are located, a 0.5-mile no-disturbance buffer would be in effect until young have fledged.
Ferruginous hawk (*Buteo regalis*)	X		X		YR	1	No additional mitigation beyond committed nest survey and 0.5-mile buffer for active nest sites.
Western burrowing owl (*Athene cunicularia*)	X				SP,S	2	Survey for active nest sites. If active sites are found, buffer zones and construction constraint periods will be coordinated with the jurisdictional agencies.

Species Name	Land Management Unit					Determination[2]	Recommended Mitigation
	National Forest		BLM				
	GMUG	San Juan	Colorado	Farmington, NM	Residence[1]		
PLANTS							
Southern maidenhair fern (*Adiantum capillus-veneris*)		X			YR	2	Conduct field surveys of identified suitable habitat prior to construction. Mitigation would include minor pipeline realignments, if practical, to avoid individual plants; flagging around individual plants; or adjustments to the ROW to protect these plants from construction disturbance.
Debeque milkvetch (*Astragalus debequaeus*)			X		YR	2	Conduct field surveys of identified suitable habitat prior to construction. Mitigation would include minor pipeline realignments, if practical, to avoid individual plants; flagging around individual plants; or adjustments to the ROW to protect these plants from construction disturbance.
Giant helleborine (*Epipactis gigantea*)	X	X	X		YR	2	Conduct field surveys of identified suitable habitat prior to construction. Mitigation would include minor pipeline realignments, if practical, to avoid individual plants; flagging around individual plants; or adjustments to the ROW to protect these plants from construction disturbance.

[1]Residence status: YR = yearlong resident, SP = spring, S = summer.
[2]1 = No impact.
2 = May adversely impact individuals, but not likely to result in a loss of viability on the BLM or USFS lands, nor cause a trend to federal listing or a loss of species viability rangewide.

ATTACHMENT 5

Strict Liability Stipulation Locations, San Juan National Forest

Location	Control Point & Estimated Length
West Slope of the Dolores River Canyon	R106 to R108 (2140 ft)
East Slope of the Dolores River Canyon	R144 to R149 +400 ft (3000 ft)
West and East Slope of Lost Canyon	S640 to S575 +400 ft (4100 ft)
Turkey Creek (north & south slopes)	S475 to S470 +450 ft (920 ft)
Chicken Creek (north & south slopes)	S375 to S370 (1800 ft)
Middle Mancos River Canyon (north & south slopes)	S210 to S180 (1750 ft)

ATTACHMENT 6
Information on Taking Appeals to the Board of Land Appeals

CSO 1840-3
(June 1993)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

INFORMATION ON TAKING APPEALS TO THE BOARD OF LAND APPEALS

DO NOT APPEAL UNLESS

1. This decision is adverse to you,

AND

2. You believe it is incorrect.

IF YOU APPEAL, THE FOLLOWING PROCEDURES MUST BE FOLLOWED

1. NOTICE OF APPEAL — Within 30 days file a *Notice of Appeal* in the office which issued this decision (see 43 CFR 4.411 and 4.413). You may state your reasons for appealing, if you desire.

2. WHERE TO FILE NOTICE OF APPEAL

BUREAU OF LAND MANAGEMENT
MONTROSE DISTRICT MANAGER
2465 SOUTH TOWNSEND
MONTROSE, COLORADO 81401

WITH COPY TO SOLICITOR

REGIONAL SOLICITOR
ROCKY MOUNTAIN REGION
755 PARFET STREET, SUITE 151
LAKEWOOD, COLORADO 80215

WITH COPY TO BOARD OF LAND APPEALS

DEPARTMENT OF THE INTERIOR
BOARD OF LAND APPEALS
4015 WILSON BLVD.
ARLINGTON, VIRGINIA 22203

3. STATEMENT OF REASONS — Within 30 days after filing the *Notice of Appeal,* file a complete statement of the reasons you are appealing. This must be filed with the Interior Board of Land Appeals, at the above address (see 43 CFR 4.412 and 4.413). If you fully stated your reasons for appealing when filing the *Notice of Appeal*, no additional statement is necessary. Copies of your statement of reasons must be filed with the Solicitor at the above address.

4. ADVERSE PARTIES

Within 15 days after each document is filed, each adverse party named in the decision and the Regional Solicitor or Field Solicitor having jurisdiction over the State in which the appeal arose must be served with a copy of: (a) the *Notice of Appeal*, (b) the Statement of Reasons, and
(c) any other documents filed (see 43 CFR 4.413).

5. PROOF OF SERVICE

Within 15 days after any document is served on an adverse party, file proof of that service with the Interior Board of Land Appeals. This may consist of a certified or registered mail "Return Receipt Card" signed by the adverse party (see 43 CFR 4.401(c)).

6. REQUEST FOR STAY

Except where program-specific regulations place this decision in full force and effect or provide for an automatic stay, the decision becomes effective upon the expiration of the time allowed for filing an appeal unless a petition for stay is timely filed (see 43 CFR 4.21). If you wish to file a petition for a stay of the effectiveness of this decision during the time that your appeal is being reviewed by the Board, the petition for a stay must accompany your notice of appeal. A petition for a stay is required to show sufficient justification based on the standards listed below. **Copies of the notice of appeal and petition for a stay must also be submitted to each party named in this decision and to the Interior Board of Land Appeals and to the appropriate Office of the Solicitor** (see 43 CFR 4.413) at the same time the original documents are filed with this office. If you request a stay, you have the burden of proof to demonstrate that a stay should be granted.

STANDARDS FOR OBTAINING A STAY

Except as otherwise provided by law or other pertinent regulation, a petition for a stay of a decision pending appeal shall show sufficient justification based on the following standards:

(1) The relative harm to the parties if the stay is granted or denied,

(2) The likelihood of the appellant's success on the merits,

(3) The likelihood of immediate and irreparable harm if the stay is not granted, and

(4) Whether the public interest favors granting the stay.

Unless these procedures are followed your appeal will be subject to dismissal (see 43 CFR 4.402). Be certain that all communications are identified by serial number of the case being appealed.

SUBPART 1821.2--OFFICE HOURS; TIME AND PLACE FOR FILING

Sec. 1821.2-1 *Office hours of State Office.* (a) State Offices and the Washington Office of the Bureau of Land Management are open to the public for the filing of documents and inspection of records during the hours

specified in the paragraph on Monday through Friday of each week with the exception of those days where the office may be closed because of a national holiday or Presidential or other administrative order. The hours during which the State Offices and the Washington Office are open to the public for the filing of documents and inspection of records are from 10 a.m. to 4 p.m. standard time or daylight saving time, whichever is in effect at the city in which each office is located.

Sec. 1821.2-2(d) Any document required or permitted to be filed under the regulations of this chapter, which is filed under the regulations of this chapter, which is received in the State Office or the Washington Office, either in the mail or by personal delivery when the office is not open to the public shall be deemed to be filed as of the day and hour the office next opens to the public.

(e) Any document required by law, regulation, or decision to be filed within a stated period, the last day of which falls on a day the State Office or the Washington Office is officially closed, shall be deemed to be timely filed if it is received in the appropriate office on the next day the office is open to the public.

ERRATA SHEET FOR THE 1998 SUPPLEMENT TO THE 1992 FINAL ENVIRONMENTAL IMPACT STATEMENT,
TRANSCOLORADO GAS TRANSMISSION PROJECT, Colorado and New Mexico

The 1998 Final Supplement to the 1992 Final Environmental Impact Statement for the TransColorado Gas Transmission Project, Colorado and New Mexico (Supplement), contained entry errors in Table 2-4 and in Appendixes C-1, C-2, and C-3 of the document. These tables listed the Temporary Use Areas for the TransColorado Project analyzed on federal and state managed lands, and on private lands that are crossed by the pipeline. The corrections are shown in the attached revised tables. The differences in the acres in the original published table, and the revised tables are summarized below. The analysis of impacts and resulting mitigation in the Supplement are still valid and accurate, and would be the same if these entry errors had not been made.

Jurisdiction*	TUAs, Original Table 2-4, in the Supplement		TUAs, Revised Table 2-4		Differences Between Revised figures in this Errata and figures in Table 2-4 in the Supplement	
	Number of TUAs	Total Acreage	Number of TUAs	Total Acreage	Number of TUAs	Total Acreage
BLM - Craig District, White River RA, CO	14	4.55	15	4.59	+ 1	+ 0.04
BLM - Grand Junction District, Grand Junction RA, CO	103	40.31	96	36.21	- 7	- 4.1
BLM - Montrose District, Uncompahgre RA, CO	141	41.07	146	38.65	+ 5	- 2.42
BLM - Montrose District, San Juan RA, CO	7	2.37	1	0.23	- 6	- 2.14
BLM - Farmington District, NM	15	6.32	19	9.19	+ 4	+ 2.87
Total BLM	280	94.62	277	88.87	- 3	-5.75
USFS- Uncompahgre NF, Ouray RD, CO	9	2.52	9	2.52	0	0
USFS- Uncompahgre NF, Norwood RD, CO	36	22.92	37	24.12	+ 1	+ 1.20
USFS- San Juan NF, Dolores-Mancos RD, CO	96	48.47	101	49.13	+ 5	+ 0.66
Total USFS	141	73.91	147	75.77	+ 6	+ 1.86
Total BLM and USFS	421	168.53	424	164.64	+3	-3.89
Private/State	401	230.33	402	219.85	+ 1	- 10.48
GRAND TOTALS	822	398.86	826	384.49	+ 4	-14.37

*RA = Resource Area; NF = National Forest; RD = Ranger District
June 4, 1998 - Montrose District Office, Bureau of Land Management

Temporary Use Area Review since the Final Supplement to the 1992 Environmental Impact Statement.

The Appendix C-1 through C-3 Temporary Use Area tables in the Final Supplement to the 1992 FEIS were compared with the temporary use areas illustrated on the project alignment sheets that were distributed with Final Supplement to the 1992 FEIS. It was determined that there were minor discrepancies in ownership between these two sources. The following Appendix C-1 through C-3 tables have been revised to match the information contained on the alignment sheets, as well as reallocation of ownership.

1. TUA tracking number entries on the following tables with the notation **NOA** indicate that the TUA is listed in the table, but is not illustrated on the alignment sheets. In most cases, the missing TUAs on the alignment sheets have been illustrated on separate site-specific channel crossing drawings.

2. TUA entries entirely in bold indicate a change in ownership between the tables in the Supplement and the attached revised tables. The size and purpose of the TUA has not changed.

3. TUA entries with only the acres in bold represent split ownership of the TUA between federal and private. In several cases, the same TUA was entered on both private and federal ownership tables, resulting in double counting. Estimated acreage was allocated to each type of ownership in the revised tables. The net result of eliminating double counting by ownership is a reduction in the total area of TUAs for the project.

Appendix C-1

TransColorado Gas Transmission Project
Temporary Use Areas on
BLM Craig District - White River Resource Area Lands

Tracking #	MP	Acres	Comments
Rio Blanco County, Colorado			
ON0666	2.98	0.11	TUA needed for spoil storage due to existing Rocky Mountain pipeline crossing.
ON0118	4.1	0.33	TUA needed for spoil and topsoil storage at a side slope.
ON0013	4.5	0.23	TUA needed for a turnaround and a small staging area.
ON0119 **NOA**	5.2	0.23	TUA needed for spoil and topsoil storage on either side of Hunter Creek.
ON0123	5.3	0.23	TUA needed for turnaround and staging area at the bottom of a steep slope on the east side of Hunter Creek Road.
ON0667	6.1	0.11	TUA needed due to existing waterline crossing.
ON0015	6.5	1.15	TUA needed to facilitate grading of ROW for stable work area due to steep side slope and subsurface rock. Rocky Mountain Pipeline to the northeast will need to be avoided.
ON0014	6.9	0.57	TUA required to facilitate grading of ROW for stable work area due to a steep side slope and rock on the ROW.
ON0124	8.1	0.34	TUA needed for turnaround and staging area at the top of a bluff prior to a steep slope down to Willow Creek.
ON0051 **NOA**	8.5	0.46	TUA needed for topsoil and spoil storage at the Willow Creek crossing.
ON0121	8.7	0.14	TUA needed for a turnaround and for a staging area at base of a steep slope.
ON0122	9.5	0.23	TUA needed for pipe truck and vehicle turnaround. Vegetation to be cleared with no excess ground disturbance.
ON0729	10.2	0.06	TUA is needed due to access road which zig-zags back and forth across Rocky Mountain Pipeline from MP 10 to MP 33. Every crossing needs additional earth cover to support heavy equipment traffic.
ON0125	15.5	0.34	TUA needed for turnaround and staging area.
ONO186	16.4	0.06	TUA needed for spoil storage at road crossing.
TOTAL		4.59	

Appendix C-1 (Continued)

TransColorado Gas Transmission Project
Temporary Use Areas on
BLM Grand Junction District - Grand Junction Resource Area Lands

Tracking #	MP	Acres	Comments
Garfield County, Colorado			
ON0137	35.1	0.23	TUA needed for spoil storage at the Conn Creek Road crossing and Rocky Mountain Pipeline crossing.
ON0138 **NOA**	35.2	2.30	TUA needed for spoil storage at an extremely deep (approx. 30') incised draw at Conn Creek.
ON0139	35.45	0.57	TUA needed for wash crossing.
ON0154	36.05	1.18	TUA needed for wash crossing.
ON0147	36.25	0.57	TUA needed for wash crossing.
ON0146	36.35	0.86	TUA needed for wash crossing.
ON0145	36.8	0.57	TUA needed for wash crossing.
ON0143	37.25	**0.28**	TUA needed for wash crossing.
ON0142	37.35	0.57	TUA needed for wash crossing.
ON0141	37.4	0.46	TUA needed for wash crossing.
ON0449	38.9	0.23	TUA needed for turnaround at the top of a steep hillside.
ON0149	38.95	0.11	TUA needed for spoil storage at the Rocky Mountain Pipeline Crossing on the north side of Logan Wash.
ON0053	39.1	0.11	TUA needed for spoil storage due to necessary grading of road embankment.
ON0450	39.2	0.34	TUA needed for turnaround at top of steep hillside.
ON0866	39.4	0.57	TUA needed due to a side slope away from centerline to the west.
ON0150	39.5	0.43	TUA needed for spoil storage at a side slope.
ON0278	39.8	0.47	TUA needed for road and pipeline crossing, plus turnaround area.
ON0279	39.9	1.32	TUA needed for road and pipeline crossing, plus turnaround area.
ON0280	40.3	0.23	TUA needed for road crossing and rock storage.
ON0281	40.4	0.11	TUA needed for Rocky Mountain Pipeline crossing.
ON0282	40.7	0.34	TUA needed for turnaround and staging area.
ON0283	40.8	0.50	TUA needed for rock and spoil storage at side hill cut and small wash crossings.
ON0284	41.2	0.11	TUA needed for rock storage.
ON0285	41.3	0.52	TUA needed due to steep slope and for rock storage.
ON0288	41.7	**0.34**	TUA needed for turnaround and rock storage on a steep slope.
Mesa County, Colorado			
ONO456	**43.5**	**2.07**	**TUA needed for spoil storage along rocky side slope just west of the Reservoir Canal.**
ON0457	43.5	1.15	TUA needed for spoil storage along rocky side slope just west of the Reservoir Canal.
ON0675	53.6	**0.28**	TUA needed due to close proximity to existing Rocky Mountain Pipeline. Cannot work on top of shallow pipeline buried in this rocky area.
ON0480	**53.6**	**0.34**	**TUA needed for spoil storage for dry drainage crossing. Dry drainage runs along center line for 100'.**
ON0676	54.05	0.47	TUA needed due to close proximity to existing Rocky Mountain Pipeline. Cannot work on top of shallow pipeline buried in rocky soil.

Tracking #	MP	Acres	Comments
Mesa County, Colorado			
ON0672	54.2	0.11	TUA needed for extra spoil storage due to existing Rocky Mountain Pipeline crossing.
ON0673	54.36	0.11	TUA needed for extra spoil storage due to existing Rocky Mountain Pipeline crossing.
ON0481	54.6	0.14	TUA needed for extra spoil storage area in a steep, rocky area near other gas lines.
ON0511	54.75	0.46	TUA needed for spoil storage at multiple pipeline crossings.
ON0512	54.85	0.57	TUA needed for turnaround, staging area, and dirt access road crossing.
ON0516	55.6	0.34	TUA needed for spoil storage at dry wash crossing.
ON0517	55.85	0.43	TUA needed for spoil and rock storage at Rocky Mountain Pipeline crossing.
ON0104	62	**2.12**	TUA needed for 13 turnouts for passing on the ROW.
ON0901	**65.8**	**1.15**	**TUA is required for spoil storage at steep slope and for the Tate Creek crossing.**
ON0025	72	0.29	TUA needed for spoil storage on a side hill cut.
ON0060	72.6	0.23	TUA needed for spoil storage at a side slope cut.
ON0026	72.8	0.17	TUA needed for a staging area and spoil storage for the Cottonwood Creek crossing.
ON0765	72.9	0.24	TUA needed due to creek crossing for spoil and storage. On the north bank, no buffer on stream as it is too steep. Also, there are big rocks in stream at the toe of the northern slope of creek. On the south side, divert small channel in main creek. Five foot buffer on main channel. Access via Cottonwood Creek Road. Flume and bridge crossing methods.
ON0876	75.1	0.09	Part of PRR017. TUA is needed to feather the ROW for visual impacts. There is no room for feathering within the 50' ROW. TUA also needed for storage of the many large boulders in the area.
ON0006	76.2	0.76	TUA is needed for spoil storage during the Sink Creek crossing. Change working side between CP D465 and CP D470 due to side slope.
ON0008	76.6	0.11	TUA needed for stringing truck turnaround. Area is fairly level, on a steep ridge. It is the first good location on this steep, dead-end for a turnaround.
ON0007	76.7	0.06	TUA is needed for rock storage.
ON0022	77.2	0.06	TUA needed for spoil storage at dry drainage. Drainage crosses the ROW at about 70 degrees and can't be blocked.
ON0021	77.3	0.23	TUA needed for storage of large rock in dry drainage.
ON0020	77.5	0.23	TUA needed for rock and spoil storage at dry drainage crossing.
ON0019	77.7	0.23	TUA needed to store rock from drainage crossing.
ON0018	78.2	0.11	TUA needed on each side of canal for canal crossing in association with proposed realignment PRR002.
ON0017	79.5	0.40	Working side change due to encroachment of severe slope into basin.
ON0766	81.1	0.11	TUA needed for a turnaround.
ON0054	81.6	0.62	TUA needed for spoil storage above and below steep slope.
ON0845	81.6	0.29	TUA is needed for spoil storage (northern TUA) and for a turnaround (southern TUA) due to a dry drainage. Stringing trucks will have to turnaround in this area due to steep slope to the north.

Tracking #	MP	Acres	Comments
Mesa County, Colorado			
ON0844	82	0.11	TUA is needed for spoil storage due dry drainage. Two drainages converge just prior to the centerline, one of which encroaches on the spoil side of the ROW.
ON1013	82	0.27	Part of PRR003. TUA is needed for dry drain crossing.
ON1016	82.2	**0.24**	Part of PRR003. TUA is needed because this area may require reverse lay due to dry drain encroachment on working side.
ON0767	82.9	0.11	TUA needed for a turnaround.
ON0847	**83.9**	**0.23**	**TUA is needed due to the crossings of a road and aqueduct for spoil storage. There is a steep slope down to the aqueduct, and than a level open area. D585 (the northern control point) has not been surveyed due to landowner access issues.**
ON0028	84.2	0.34	TUA needed for the CS-10 road crossing.
ON0029	84.2	0.11	TUA needed due to a steep slope just past a large change of direction (PI D595).
ON0032	**84.3**	**0.06**	**TUA is needed for spoil storage due to a dry drainage crossing.**
ON0030	84.5	0.26	TUA needed due to deep, dry drainage, with almost vertical banks, that crosses the ROW.
ON0031	84.51	0.17	TUA needed for spoil storage at a double incised draw with vertical banks.
ON0033	84.9	0.09	TUA needed due to the fact that the toe of a very steep slope on the spoil side ends at the ditch line.
ON0034	85.28	0.17	TUA needed for spoil storage at side hill cut.
ON0035	85.4	0.06	TUA needed for spoil storage at dry drainage crossing.
ON0036	85.6	0.23	TUA needed due to a side hill cut.
ON0108	86.68	0.17	TUA needed for spoil storage at a side hill cut.
ON0107	86.73	0.09	TUA needed for spoil storage at eroded dry draw with multiple channels.
ON0219	86.78	0.06	TUA needed for spoil storage at a gully crossing.
ON0220	86.9	0.14	TUA needed for side slope cut-and-fill.
ON0221	87.1	0.80	TUA needed for side slope cut-and-fill as well as sharp overbend cut.
ON0167	87.25	0.32	TUA needed for spoil storage for boxed crossing at dry gullies.
ON0175	87.5	1.03	TUA needed for spoil storage at steep side slope.
ON0166	87.6	0.09	TUA needed for spoil storage for overbend.
ON0165	87.7	0.29	TUA needed for spoil storage for creek crossing. Stream channel 10' below grade and 50' wide.
ON0164	92	0.09	TUA needed for spoil storage at a dry wash crossing.
ON0184	92.1	0.30	TUA needed for spoil storage at a dry wash crossing.
ON0156	92.2	0.06	TUA needed for a parking area.
ON0848	92.4	0.14	TUA is needed due to the Department of Energy's road (paved) bore and necessary parking space. Level range land adjacent to paved road.
ON0849	94	0.11	TUA is needed for a turnaround. Area is level rangeland.
ON0658	95.3	0.20	TUA needed for spoil storage due to a side hill cut.
ON0659	95.31	0.07	TUA needed for spoil storage due to a side hill cut.
ON0657	95.5	0.33	TUA needed for spoil storage due to a cut in the bank of wash. The south bank of King Creek (a dry wash) is 20' high. Dry channel of King Creek is 35' from the top of bank.
ON0656	95.5	0.29	TUA needed for spoil storage due to a cut in the bank of wash. The dry channel of King Creek is 25' from top of bank.

Appendix C-1 (Continued)

Tracking #	MP	Acres	Comments
Mesa County, Colorado			
ON0660	95.7	0.09	TUA needed for spoil storage due to a side hill cut.
ON0661	95.7	0.04	TUA needed for spoil storage due to a side hill cut.
ON0662	95.7	0.10	TUA needed for spoil storage due to a side hill cut.
ON0650	96.1	0.03	TUA needed for spoil storage due to side bend at PI.
ON0651	96.24	0.20	TUA needed due to Deer Creek crossing.
ON0652	96.3	0.03	TUA needed for spoil storage due to overbend at top of slope on the south side of Deer Creek.
ON0187	97.5	0.80	TUA needed for boulder storage at the bottom of slope, side cut on slope, and overbend at top.
ON0163	97.68	0.60	TUA needed for spoil storage for overbend.
TOTAL		36.21	

Appendix C-1 (Continued)

TransColorado Gas Transmission Project
Temporary Use Areas on
BLM Montrose District - Uncompahgre Basin Resource Area Lands

Tracking #	MP	Acres	Comments
Delta County, Colorado			
ON0895	**97.9**	**1.72**	**Part of PRR019. TUA needed for spoil storage at a steep slope on both sides of wash at the toe.**
ON0305	98.13	0.22	TUA needed for spoil storage in and out of dry channel.
ON0304	98.17	0.26	TUA needed for spoil storage for overbend.
ON0157	98.3	0.29	TUA needed for spoil storage for overbend and steep slope.
ON0158	98.4	0.57	TUA needed for spoil storage at a steep intermittent stream crossing.
ON0155	98.51	0.19	TUA needed for storage of spoil at a side slope.
ON0161	98.52	0.14	TUA needed for spoil storage for overbend at the top of a steep slope.
ON0168	98.73	0.17	TUA needed for spoil storage for an overbend.
ON0170	98.77	0.14	TUA needed for spoil storage for a side hill cut.
ON0169	98.8	0.36	TUA needed for spoil storage for intermittent stream crossing.
ON0171	98.9	0.37	TUA needed for spoil storage for a side hill cut.
ON0177	99.1	0.32	TUA needed for spoil storage at steep slope and overbend.
ON0178	99.3	0.17	TUA needed for spoil storage at the bottom of a steep channel crossing.
ON0176	99.4	0.37	TUA needed for spoil storage at steep slope with minor side cut.
ON0308	99.9	0.07	0 TUA needed for spoil storage for an overbend.
ON0309	100.01	0.14	TUA needed for spoil storage at a steep slope to an intermittent stream with a vertical bank on the north side.
ON0307	100.07	0.09	TUA needed for spoil storage at an intermittent channel crossing with a 10' vertical bank.
ON0310	100.11	0.34	TUA needed for spoil storage for a side hill cut and overbend at the top of slope.
ON0312	100.62	0.06	TUA needed for spoil storage for a side hill cut.
ON0311	100.7	0.03	TUA needed for spoil storage for overbend.
ON0232	100.79	0.07	TUA needed for overbend at the top of a steep slope.
ON0233	100.87	0.14	TUA needed for spoil storage at an intermittent stream channel crossing.
ON0235	100.89	0.11	TUA needed for spoil storage for cut in bank of Wells Gulch.
ON0234	100.94	0.06	TUA needed for spoil storage for a side hill cut.
ON0236	100.95	0.06	TUA needed for spoil and rock storage at a side hill cut.
ON0238	102.03	0.10	TUA needed for spoil storage for broken ground in the bottom of a dry wash with boulder piles.
ON0237	102.07	0.10	TUA needed for spoil storage at a side hill cut.
ON0239	102.1	0.26	TUA needed for spoil storage for a side hill cut.
ON0240	102.3	0.23	TUA needed for spoil storage at a 10' deep wash crossing with rock piles.
ON0241	103.11	0.03	TUA needed for spoil storage at a dry wash crossing.
ON0242	103.22	0.11	TUA needed for spoil storage for large rocks and overbend.
ON0243	104.43	0.14	TUA needed for spoil storage for a side hill cut.
ON0244	104.5	0.09	TUA needed for spoil storage for a side hill cut.
ON0245	105	0.23	TUA needed for spoil storage for a side hill cut and through cut on ridge top.
ON0246	105	0.23	TUA needed for spoil storage for a side hill cut.

Appendix C-1 (Continued)

Tracking #	MP	Acres	Comments
Delta County Colorado			
ON0313	106.5	0.11	TUA needed for spoil storage for a side hill cut.
ON0346	108.9	0.26	TUA needed for spoil storage for a 10-15% side slope and loose boulders.
ON0581	112.8	0.04	TUA needed for spoil storage due to overbend.
ON0580	112.9	0.04	TUA needed for spoil storage to cut through rock ledge.
ON0564	113.01	0.17	TUA needed for spoil storage for side hill cut at toe of slope.
ON0563	113.03	0.06	TUA needed for spoil storage due to cut through rock ledge.
ON0562	113.15	0.14	TUA needed for spoil storage due to side hill cut.
ON0561	113.8	0.07	Part of PRR074. TUA needed due to road crossing and bend installation.
ON0560	113.9	0.11	Part of PRR074. TUA needed due to road crossing.
ON0628	114.4	0.17	TUA needed for spoil storage due to steep slope and overbend cut.
ON0626	114.5	0.92	TUA needed for storing rocks and spoil due to steep slope with extensive bedrock outcrop and large boulder slabs.
ON0627	114.5	0.34	TUA needed for storage of boulders and spoil due steep slope with bedrock outcroppings.
ON0625	114.53	0.13	TUA needed due to steep slope to the north of the road crossing which will require considerable excavation.
ON0629	114.56	0.83	TUA needed to provide setback for spoil storage and for space to work around cottonwood trees.
ON0624	114.6	0.26	TUA needed due to overbend for spoil storage on slope the south of Roubideau Creek.
ON0623	**115.0**	**0.32**	**TUA needed due to sideslope cut-and-fill.**
ON0622	115.09	0.11	TUA needed due to sideslope cut-and-fill.
ON0621	115.32	0.11	TUA needed for turnaround .
ON0620	115.34	0.71	TUA needed due to side slope cut-and-fill. **(Portion of this TUA in Montrose County, Colorado)**
Montrose County, Colorado			
ON0609	115.4	0.52	TUA needed for side slope cut-and-fill.
ON0608	115.53	0.26	TUA needed due to minor side slope cut-and-fill.
ON0607	115.66	0.40	TUA needed due to minor side slope and rocky soils.
ON0582	115.83	0.11	TUA needed for spoil storage for overbend cut on top of south facing slope.
ON0606	115.87	1.38	TUA needed for storage due to steep slopes with bedrock outcrops, and two dry washes with shallow bedrock channels.
ON0605	115.9	0.23	TUA needed for spoil and rock storage due to high, steep knoll with thick, sandstone ledge cap rock.
ON0604	115.92	0.17	TUA needed due to side slope cut-and-fill. Long and moderate slope with minor side slope and small dry wash.
ON0603	116.1	0.46	TUA needed for spoil, bedrock, and boulder stockpiles on steep slope. Steep south-facing slope with sandstone ledge outcrop and large sandstone slabs and boulders.
ON0602	116.11	0.11	TUA needed for spoil storage due to dry wash crossing at toe of slope.
ON0600	116.2	0.17	TUA needed due to cut-and-fill for side slopes, shallow bedrock and rocky soils.

Appendix C-1 (Continued)

Tracking #	MP	Acres	Comments
Montrose County, Colorado			
ON0601	116.2	0.23	TUA needed due to sideslope with rock soils and shallow bedrock.
ON0589	116.3	0.11	TUA needed for spoil and rock stockpile due to small dry wash with shallow bedrock.
ON0588	116.4	0.11	TUA needed for storage of sandstone boulders scattered through open area.
ON0586	116.5	0.10	TUA needed to stockpile spoil and rock due to dry wash and exposed bedrock.
ON0587	116.53	0.06	TUA needed for stockpiling bedrock due to sandstone ledge outcrop at crest of slope.
ON0585	116.7	0.09	TUA needed due to slope and old irrigation canal.
ON0584	117	0.10	TUA needed for rock and boulder stockpiles due to slope with shallow bedrock ledge.
ON0599	117.5	0.11	TUA needed for spoil storage for a cut though a bedrock ledge on a 30% slope.
ON0598	117.6	0.09	TUA needed for spoil storage for an overbend at the top of a 25% slope in both directions.
ON0597	117.7	0.11	TUA needed for spoil storage to accommodate cut through a 35' high rock ledge on a 40% slope.
ON0596	117.8	0.11	TUA needed for spoil storage to accommodate cut through rock ledges.
ON0583	117.9	0.09	TUA needed to allow the use of field bends and avoid the need for factory induction bend.
ON0593	118.05	0.11	TUA needed for spoil storage at a side hill with large rocks.
ON0594	118	0.03	TUA needed for spoil storage for cut in the south bank of a dry wash.
ON0595	118	0.03	TUA needed for spoil storage for cut in the north bank of a dry wash.
ON0850	118.1	0.09	TUA needed for sharp PI.
ON0592	118.2	0.04	TUA needed for spoil storage for cut in bank of a dry wash.
ON0591	118.45	0.06	TUA needed for spoil storage for cut through rock ledge.
ON0590	118.51	0.03	TUA needed for spoil storage for cut through the bank of a dry wash.
ON0579	118.53	0.04	TUA needed for spoil storage for cut through the bank of a dry wash.
ON0578	118.54	0.11	TUA needed for spoil storage for cut through rock ledge.
ON0577	118.62	0.03	TUA needed for spoil storage for cut through rock ledge.
ON0575	118.9	0.09	TUA needed for spoil storage for cut through rock ledge and a 25% slope with large, loose boulders.
ON0576	118.9	0.11	TUA needed for spoil storage for cut through rock ledge. Also, large, loose boulders and steep slope on the north side of a wash.
ON0574	119.03	0.17	TUA needed for spoil storage for cut through bedrock ledges.
ON0573	119.07	0.05	TUA needed for spoil storage at a 30% slope with exposed bedrock.
ON0572	119.09	0.03	TUA needed for spoil storage for cut in bank of dry wash.
ON0571	119.1	0.11	TUA needed for spoil storage for a side hill cut.
ON0441	120.1	0.03	TUA needed for spoil storage at cut through 10' high rock ledge.
ON0403	121.8	0.11	TUA needed for crossing of steep gully and rock outcrop.
ON0402	122.2	0.11	TUA needed for spoil storage at a rock ledge with large surface boulders.
ON0401	122.3	0.11	TUA needed for a dry stream crossing with a 10-15' bank.
ON0438	122.3	0.11	TUA needed due to intermittent stream channel.
ON0400	122.35	0.06	TUA needed for spoil storage on slope with exposed bedrock ledges.
ON0389	122.4	0.11	TUA needed for exposed rock ledge and side cut on 35% slope.

Appendix C-1 (Continued)

Tracking #	MP	Acres	Comments
Montrose County, Colorado			
ON0424	122.5	0.17	TUA needed for spoil storage at side cut north of a wash crossing with 10' banks.
ON0422	122.56	0.11	TUA needed for spoil storage at a side hill cut.
ON0423	122.6	0.09	TUA needed for spoil storage at steep slope with bedrock ledges.
ON0439	122.6	0.43	TUA needed due to steep slope with bedrock ledges and large surface boulders.
ON0437	123	0.11	TUA needed due to slope and wash crossing.
ON0388	123.05	0.11	TUA needed for spoil storage at a steep slope with bedrock ledges.
ON0387	123.09	0.17	TUA needed for spoil storage at a steep slope with bedrock ledges and loose boulders.
ON0386	123.11	0.24	TUA needed for spoil storage at a steep slope with large surface rock and exposed bedrock.
ON0543	123.15	0.11	TUA needed for spoil storage at cut through steep bank of intermittent stream.
ON0384	123.18	0.29	TUA needed for spoil storage at steep slope with loose boulders.
ON0542	123.68	0.07	TUA needed for spoil storage at cut through steep bank of intermittent stream.
ON0385	123.75	0.06	TUA needed for spoil storage for an overbend.
ON0321	123.89	0.03	TUA needed for spoil storage for cut in stream bank.
ON0322	124	0.17	TUA needed for spoil storage for cut through a steep slope with exposed bedrock and cut through a dry wash with a 6-8' bank.
ON0323	124.4	0.09	TUA needed for spoil storage for a 25% slope.
ON0324	124.7	0.23	TUA needed for spoil storage at a steep slope with bedrock outcrops and large boulders. Overbend at top of slope.
ON0325	124.7	0.09	TUA needed for spoil storage for side cut through small wash and cut through south bank of main wash.
ON0326	124.9	0.80	TUA needed for spoil storage at 45% slope with exposed bedrock outcrops, rock size to 15' x 5'.
ON0328	124.95	0.11	TUA needed for spoil storage for a side hill cut through a shallow wash on the ROW for approximately 200'.
ON0327	125	0.16	TUA needed for spoil storage for side hill cut on south side of gulch.
ON0329	125.22	0.65	TUA needed for spoil storage at a 35% slope with exposed bedrock outcrops 35' and 15' high, plus loose surface boulders to 10' x 15'. Overbend at top of slope.
ON0330	125.28	0.13	TUA needed for spoil storage at a 30% slope with surface boulders. There is a road on the working side. Slope and TUA continue north from E535. See ON0331.
ON0331	125.32	0.17	TUA needed for spoil storage for side hill cut through wash on a 25% slope then 10' bank of a dry wash on the south side of Coalbank Canyon.
ON0335	125.39	0.09	TUA needed for spoil storage for a 5% side hill with a 5'road bank cut at road crossing.
ON0333	125.47	0.03	TUA needed for spoil storage at a 5% side hill and both sides of a small, dry wash.
ON0332	125.5	0.06	TUA needed for spoil storage for an overbend at the top of a 25% slope with a rocky surface.
ON0181	125.51	0.34	TUA needed for a loading and staging area for the end of Spread 2.
ON0334	125.6	0.15	TUA needed for spoil storage for a 5-7% side slope on the north side of a dry wash.

Appendix C-1 (Continued)

Tracking #	MP	Acres	Comments
Montrose County, Colorado			
ON0213	125.9	0.30	TUA needed for MLV 11 and 12, turnaround/staging area, and hydrotest break point. Transfer Rd. south of TUA.
ON0212	126.8	0.09	TUA needed for road crossing.
ON0190	130.3	0.34	TUA needed for a turnaround at the top of a steep wash, plus a hydrotest break.
ON0191	130.4	0.23	TUA needed for side slope and dry wash crossing.
ON0271	153.6	0.11	TUA needed for drainage cut into side of ROW.
ON0272	154.4	0.34	TUA needed for staging area and turnaround.
ON0273	154.5	1.15	TUA needed for spoil storage at side hill cut.
ON0274	154.65	0.34	TUA needed for spoil storage at side hill cut and Rocky Mountain Pipeline crossing.
ON0275	154.7	**2.76**	TUA needed for spoil storage at side hill cut.
ON0277	155.4	1.00	TUA needed for spoil storage at a side hill cut and steep ROW.
ON0885 **NOA**	155.7	1.27	TUA needed for spoil storage at the San Miguel River crossing.
ON0682	155.75	3.25	TUA needed due to the lack of workspace and existing false fill.
ON0683	156.4	0.13	TUA needed at Rocky Mountain Pipeline crossing in association with proposed realignment PRR027R. TUA has been designed on south side Rocky Mountain Pipeline due to false fill left from installation of pipeline out of the San Miguel Canyon.
ON0684	156.5	1.16	TUA needed due to side hill, road crossing, rock, and pigging station for Rocky Mountain Pipeline.
San Miguel County, Colorado			
ON0360	166	**.29**	TUA needed for spoil and rock storage at a rocky side slope.
ON0364	168.8	0.14	TUA needed for rock storage for grade and ditch.
ON0365	168.9	0.46	TUA needed for rock storage from grade and ditch.
ON0366	169	0.26	TUA needed for turnaround after long, steep, rocky slope.
La Plata County, Colorado			
ONO746	**236**	**0.23**	**TUA needed for spoil due to side slope.**
TOTAL		**38.65**	

Appendix C-1 (Continued)

TransColorado Gas Transmission Project
Temporary Use Areas on
BLM Farmington District

Tracking #	MP	Acres	Comments
San Juan County, New Mexico			
ON1023	**262.3**	**1.84**	**Part of PRR065R. TUA is needed for crossing steep slope.**
ON1024	**262.5**	**0.29**	**Part of PRR065R. TUA is needed for crossing dry wash and to descend from steep slope.**
ON1025	**262.5**	**0.63**	**Part of PRR065. TUA is needed to cross two 75' W x 30'D washes.**
ON1026	**262.5**	**0.13**	**Part of PRR065. TUA is needed to install PI's and to cross existing pipeline.**
ON0830	264.2	0.35	TUA needed for spoil storage at a side slope. Shell's carbon dioxide pipeline approximately 25' from centerline on spoil side.
ON0889	264.5	0.72	TUA needed for an extremely long road bore with a drag section.
ON0890	264.5	0.28	TUA needed for road bore.
ON0831	265.4	0.11	TUA needed for access road crossing.
ON0832	265.7	0.11	TUA needed for natural gas pipeline crossing. Spilt TUA at centerline of gas line with 50' on either side.
ON0833	266.1	0.34	TUA needed for spoil storage at crossing of a deep, wide dry drain. No TUA is available on the working side due to a second dry drainage that runs parallel to the ROW.
ON0834	266.5	0.11	TUA needed for spoil storage at road crossing.
ON0835	266.8	0.88	TUA needed for spoil storage at 20% side slope and dry wash crossing (20' banks, 40' wide).
ON0836	267	1.03	TUA needed to avoid large, deep, dry gulch on the working side. Possible working side switch. Also, large, deep dry drainage crossing (12' banks, 40' wide). Side slope is on rocky knoll and encompasses most of the working side.
ON0837	267.6	0.11	TUA needed for spoil storage at the El Paso Natural Gas Lateral #H41 crossing. Spilt TUA at centerline of gas line with 50' on either side.
ON0794	267.65	0.11	TUA needed for spoil storage due to dry wash crossing (tributary to McDermott Arroyo).
ON0795	267.85	1.03	TUA needed for spoil storage due to large arroyo crossing. Large (100' wide by 30' deep) arroyo (McDermott Arroyo) in rangeland.
ON0796	268.4	0.11	TUA needed due to side slope cut-and-fill. Steep knolls and side slopes in rangeland.
ON0797	268.5	0.49	TUA needed due to side slope cut-and-fill. Steep knolls and side slopes in rangeland.
ON0798	268.9	0.52	TUA needed for spoil storage due to arroyo crossing and excavation to stabilize headcuts.
TOTAL		9.19	

Appendix C-2

TransColorado Gas Transmission Project
Temporary Use Areas on
Uncompaghre National Forest - Ouray Ranger District Lands

Tracking #	MP	Acres	Comments
Montrose County, Colorado			
ON0201	134.6	0.34	TUA needed for temporary rock storage in a very rocky area. TransColorado pipeline parallels Rocky Mountain Pipeline where excess rock is piled along Rocky Mountain ROW indicating shoot rock was encountered intermittently in this area.
ON0198	135.5	0.21	TUA needed for hydrostatic test break and staging area.
ON0197	136.1	0.52	TUA needed for Transfer Road and Rocky Mountain Pipeline crossings.
ON0199	137.2	0.26	TUA needed for road crossing, turnaround, and staging area.
ON0189	139.5	0.17	TUA needed for hydrostatic testing location.
ON0192	142.0	0.20	TUA needed for spoil storage at drainage. Associated with proposed realignment PRR061. NOTE: If proposed realignment PRR061 is not approved, the southern extra work space will have to be extended an additional 400'.
ON0130	142.2	0.34	TUA needed since Rocky Mountain Pipeline is in the working side of the ROW.
ON0211	142.4	0.34	TUA needed for road crossing (dirt road to Lazy Cow Camp), and for turnaround.
ON0188	143.3	0.14	TUA needed for spoil storage at a road crossing.
TOTAL		2.52	

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TransColorado Gas Transmission Project
Temporary Use Areas on
Uncompaghre National Forest - Norwood Ranger District Lands

Tracking #	MP	Acres	Comments
Montrose County, Colorado			
ON0247	144.1	0.17	TUA needed for spoil storage for road crossing and tie-in work space.
ON0193	145.2	0.14	TUA needed for Rocky Mountain Pipeline crossing.
ON0194	145.6	0.14	TUA needed for spoil storage at stream crossing. 100' setback from stream.
ON0195	145.7	0.52	TUA needed for spoil storage at a steep side hill cut.
ON0131	145.9	0.34	TUA needed for a turnaround and staging area.
ON0884	146.1	3.76	Part of PRR059. TUA needed for spoil storage at a side slope
ON0132	**146.3**	**1.14**	**TUA needed for spoil storage for side slope construction.**
ON0133	**146.4**	**0.06**	**TUA needed for spoil storage.**
ON0135	147.2	0.11	TUA needed for road crossing.
ON0248	147.3	0.34	TUA needed for working space for a steep slope to the south.
ON0249	147.4	0.11	TUA needed for working space for a steep slope to the south.
ON0250	147.5	0.11	TUA needed for spoil storage at a dry drainage.
ON0251	147.5	0.22	TUA needed for spoil storage at the Rocky Mountain Pipeline crossing.
ON0136	147.8	0.34	TUA needed for a turnaround before the very steep terrain to the south.
ON0253	147.8	0.23	TUA needed for spoil storage and truck turnaround before dead end. 100' setback from wetland.
ON0254	148.1	0.34	TUA needed for turnaround and staging area.
ON0255	148.4	0.29	TUA needed for Sheep Creek crossing. 100' setbacks from each TUA to creek.
ON0258	150.2	0.29	TUA needed for spoil storage at steep side hill cut.
ON0257	150.4	0.14	TUA needed for spoil storage at dry drainage crossing. Will have to pad over the Rocky Mountain Pipeline to use this space.
ON0259	151.0	0.17	TUA needed for spoil storage at steep side hill and cut bank from the Rocky Mountain ROW.
ON0260	151.1	0.11	TUA needed for spoil storage at a dry drainage crossing.
ON0261	151.2	0.11	TUA needed for turnaround.
ON0262	151.5	0.06	TUA needed for spoil storage for dry drainage crossing.
ON0263	151.7	0.32	TUA needed for storage space for rock.
ON0264	151.6	0.17	TUA needed for crossing low hanging power lines.
ON0265	151.9	1.00	TUA needed for excess rock storage from old and new ROW. This TUA is in the old ROW so little new vegetation will be disturbed.
ON0266	152.2	0.23	TUA needed for road crossing and turnaround at the bottom of a steep slope.
ON0267	152.3	0.09	TUA needed for spoil storage at a road crossing.
ON0268	152.4	0.09	TUA needed for spoil storage at a road crossing.
ON0269	152.6	0.09	TUA needed for spoil storage at a road crossing.
ON0270	152.7	0.09	TUA needed for spoil storage at a road crossing.
San Miguel County, Colorado			
ON0369	169.5	0.51	TUA needed for turnaround for equipment at long, steep, rocky slope with no exit.
ON0380	169.6	0.95	TUA needed for storage room for heavy concentrations of rock.
ON0355	169.7	0.64	TUA needed for spoil and rock storage at steep side slope. Note: CP N410 as staked in the field is N405 on the Atlas Sheet.

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Tracking #	MP	Acres	Comments
San Miguel County, Colorado			
ON0354	169.8	0.87	TUA needed for spoil and rock storage at steep, rocky slope. Note: CP N410 as staked in the field is N405 on the Atlas Sheet.
ON0353	169.9	0.34	TUA needed for turnaround area and staging area at steep slope. Note: CP N410 as staked in the field is shown as N405 on the Atlas Sheet.
ON0356	170.0	9.49	TUA needed for rock storage in a very rocky area, primarily sandstone.
TOTAL		24.12	

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TransColorado Gas Transmission Project
Temporary Use Areas on
San Juan National Forest – Mancos/Dolores Ranger District Lands

Tracking #	MP	Acres	Comments
Dolores County, Colorado			
ON0678	202.5	**1.21**	TUA needed for spoil storage at a side hill slope.
ON0431	202.6	0.23	TUA needed due to 25' stream crossing with wetland fringes.
ON0853	203.1	0.15	TUA is needed due to a road crossing on main county road (gravel). Road name is Dolores/Norwood Road.
ON0854	203.1	0.17	TUA is needed due to road crossing on main county road (gravel). Road name is Dolores/Norwood Road.
ON0892	204.2	0.39	Part of PRR062. TUA needed for spoil storage at Beaver Creek crossing.
ON0649	205.2	0.23	TUA needed for spoil storage at road crossing, probable bore.
ON0647	205.9	0.06	TUA needed for spoil storage at an 18% side slope.
Montezuma County, Colorado			
ON0632	207.1	0.06	TUA needed for spoil storage for a side hill cut.
ON0633	207.1	0.06	TUA needed for spoil storage for a side hill cut on the south side of Rocky Draw, a dry wash.
ON0646	207.2	0.69	TUA needed for spoil storage at a 25% side slope with a dry drain at the bottom of the slope.
ON0645	207.4	0.11	TUA needed for spoil storage at road crossing. Control point J40 should be centered with 100' of TUA on either side.
ON0634	207.9	0.29	TUA needed for spoil storage for a side hill cut with large, loose surface boulders.
ON0638	208.2	0.06	TUA needed for spoil storage on a rocky slope on the south side of a dry draw above Boggy Draw Reservoir.
ON0635	208.3	0.12	TUA needed for spoil storage for large rocks at a rocky slope on the north side of a dry fork of Turkey Creek.
ON0637	208.3	0.17	TUA needed for spoil storage for cut through bedrock ledges 5' to 15' high.
ON0636	208.4	0.22	TUA needed for spoil and rock storage for slope on the south side of the dry fork of Turkey Creek.
ON0639 **NOA**	211.4	0.46	TUA needed for turnaround at the top of a steep slope (70%), plus an overbend on the south side of the Dolores River Canyon. Staging area for steep slope to Dolores River.
ON0640 **NOA**	211.4	0.60	TUA needed for spoil storage on a very steep slope on the west side of Dolores Canyon.
ON0641 **NOA**	211.5	2.75	TUA needed for spoil storage on a very steep slope on the west side of Dolores Canyon.
ON0642 **NOA**	211.6	0.69	TUA needed for spoil storage for steep slope with some side hill cuts.
ON0643 **NOA**	211.65	0.09	TUA needed for spoil storage for side hill cut plus turnaround at the base of hill on the bottom of the slope on the west side of the Dolores River canyon.
ON0886 **NOA**	211.9	3.05	Outside existing 200' corridor. TUA needed for Dolores River and Highway 145 crossings.

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Tracking #	MP	Acres	Comments
Montezuma County, Colorado			
ON0483 **NOA**	212.2	1.47	TUA needed for spoil storage at steep slope with excess rock.
ON0484 **NOA**	212.3	1.17	TUA needed to feather the edge of the ROW and for rock storage, as agreed in the field with USFS.
ON0485 **NOA**	212.4	0.56	TUA needed for staging area in a flat area, out-of-sight from Highway 145.
ON0486	212.5	1.19	TUA needed for visual feathering the edges of the ROW. Steep area which can be seen from Highway 145, except the northern 150' which is screened. Due to the limited working space, some of this TUA will be used for rock storage and work space as agreed to in the field with USFS.
ON0809	212.6	0.77	TUA needed due to steep slope increases. Brushy vegetation mixed with oak brush.
ON0370	212.8	0.34	TUA needed for staging area on last flat area prior to steep visual area.
ON0372	213.45	0.11	TUA needed due to dry drainage ditch crossing.
ON0371	213.6	0.40	TUA needed for turnaround and staging area at USFS Road. 558 crossing.
ON0373	213.95	0.11	TUA needed due to dry wash crossing and pipeline ROW.
ON0374	214.3	2.04	TUA needed due to dry wash crossing and rocky, steep slopes on east side of wash. Intermittent flow in wash.
ON0375	215.1	0.11	TUA needed due to dry drainage ditch crossing.
ON0376	215.65	0.40	TUA needed for turnaround and staging area due to road crossing.
ON0377	215.9	0.14	TUA needed due to dry drainage crossing for storage of excess rock and spoil from drainage.
ON0378	216.6	0.09	TUA needed due to dry drainage crossing for extra spoil storage.
ON0379	216.8	0.11	TUA needed for extra material from ROW on a side hill.
ON0390	217.6	0.06	TUA needed for storage of extra rock.
ON0391	217.7	0.17	TUA needed due to USFS Road 556 crossing for spoil storage and to provide work space for tie in while keeping the road open
ON0392	217.8	0.86	TUA needed due valve site, MLV-19 .
ON0393 **NOA**	219.3	0.86	TUA needed in flat area with lots of cut and downed aspen for turnaround and staging area for lost canyon.
ON0394 **NOA**	219.5	1.89	TUA needed for excess rock storage and working space on steep ground.
ON0395 **NOA**	219.6	0.22	TUA needed due to steep slopes above Lost Creek.
ON0396 **NOA**	219.7	2.49	TUA needed due Lost Creek stream crossing and will require a reinforced fence across the TUA and the ROW prior to any ROW excavation.
ON0904 **NOA**	220.0	0.39	TUA needed for spoil storage at steep slope with rocks, timber and brush.
ON0397 **NOA**	220.05	1.88	TUA needed for turnaround and staging areas on each side of steep rocky slope/south top of Lost Canyon.
ON0436	220.9	2.53	TUA needed due to creek crossing for turnaround and staging area.
ON0398	221.4	0.57	TUA needed for turnaround and staging area.
O0399	222.45	0.86	TUA needed for turnaround and staging area.
O0487	222.5	0.17	TUA needed for spoil storage for dry drainage crossing.
O0410	222.6	0.09	TUA needed for extra dirt storage at dirt road crossing.
O0411	222.8	0.57	TUA needed for turnaround and staging area.

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Tracking #	MP	Acres	Comments
Montezuma County, Colorado			
O0412 **NOA**	223.4	0.57	TUA needed for turnaround and staging area.
ON0488 **NOA**	223.5	0.34	TUA needed for spoil storage at Turkey Creek crossing. 100' setbacks from TUA to creek.
ON0546	223.65	0.34	TUA needed for spoil storage at road crossing and turnaround/staging area.
ON1035	223.7	0.23	TUA is needed for Turkey Ditch crossing and small pond crossing. Delete this request if PRR037 is approved.
ON0491	224.1	0.11	TUA needed for spoil storage for both sides of the ROW south of the canal.
ON0413	225.1	0.84	TUA needed for turnaround and staging area.
ON0414	225.2	1.37	TUA needed for turnaround and staging area. Also, needed area along ROW to obtain extra rock free pad dirt (approved by USFS agent).
ON0415	225.6	0.14	TUA needed for turnaround and dirt road crossing open cut.
ON0416 **NOA**	226.15	0.57	TUA needed for turnaround and staging area.
ON0492 **NOA**	226.3	0.37	TUA needed for Chicken Creek crossing.
ON0417 **NOA**	226.5	0.57	TUA needed for turnaround and staging area.
ON0418	226.6	0.11	TUA needed due to gravel, USFS Road 561.
ON0493	226.65	0.06	TUA needed for spoil storage at small, flowing 2' irrigation ditch crossing.
ON0495	227.4	0.46	TUA needed for turnaround. This is the last location prior to the dead end caused by Jackson Gulch Canal.
ON0724	228.3	0.17	TUA is needed to store spoil from side slope.
ON0723	228.4	0.23	TUA is needed to store spoil due to cut in steep, side slope.
ON0740	228.8	0.11	TUA is needed to store spoil from side hill cut.
ON0741	229.1	0.26	TUA is needed for turnaround and staging for slope with creek crossing at bottom.
ON0722	229.4	0.23	TUA is needed to store spoil due to dry drainage with steep, northern banks. Dry drainage runs within 40' of pipeline route on working side.
ON0721	229.45	0.23	TUA is needed due to dry drainage with 8' banks. Willows in bottom of drainage. Possible wetland, although may not meet percent cover. Also, two other possible dry wetlands nearby and one is inside ROW corridor.
ON0720	229.5	0.17	TUA is needed due to dry drainage with steep banks and USFS Road #328 which needs to remain open.
ON0719	229.7	0.18	TUA is needed for storage of cut materials due to side slope.
ON0718	229.8	0.29	TUA is needed for storage of cut material due to side slope.
ON0717	230.0	0.12	TUA is needed due to side slope.
ON0716	230.2	0.34	TUA is needed due to dry drainage (20' wide) and possible wetland (10' wide) in bottom (bearing willows) with 20'-high bank on southern side.
ON0764	230.4	0.23	TUA needed due to spoil from USFS Road 566 crossing and staging for areas with limited access.
ON0498	230.5	0.09	TUA needed for spoil storage for crossing small, flowing irrigation canal.
ON0499	230.6	0.20	TUA needed for storage for excess rock.
ON0500 **NOA**	230.7	0.46	TUA needed for turnaround area prior to crossing the Middle Mancos.

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Tracking #	MP	Acres	Comments
Montezuma County, Colorado			
ON0501 **NOA**	230.8	0.03	TUA needed for spoil storage at crossing small flowing irrigation canal.
ON0502 **NOA**	230.9	0.72	TUA needed for Middle Mancos River crossing. Over 100' setbacks from all TUA to river.
ON0503	231.9	0.34	TUA needed for spoil storage at side slope with rock and a dry drainage crossing.
ON0725	232.3	0.14	TUA is needed to store spoil from cut in side slope.
ON0726	232.5	0.34	TUA is needed to store spoil due to USFS Road 567D crossing.
ON0728	232.5	0.16	TUA is needed to store spoil due to cut in side slope.
ON0727	232.55	0.09	TUA is needed to store spoil due to grading of slope to get spread through without a turnaround.
ON0712	233.9	0.38	TUA is needed due to slope to store spoil from slope cut.
ON0713	234.1	0.72	TUA is needed for turnaround at the base of hill, spoil storage, and extra work room.
ON0714	234.1	0.26	TUA is needed due to slope for turnaround and staging area.
ON0715	234.6	0.26	TUA is needed due to dual pipeline crossings (North West pipeline and Mapco pipeline).
ON0710	235.1	0.29	TUA is needed due to USFS Road #316 crossing.
ON0709	235.2	0.14	TUA is needed for spoil storage due to USFS Road #316. TUA will enable contractor to reverse working side, thereby keeping construction equipment and materials out of USFS Road #316.
ON0711	235.25	0.27	TUA is needed due to USFS Road #316 crossing for spoil and boring equipment storage.
ON0708	**235.3**	**0.17**	**TUA is needed due to USFS Road #316 crossing.**
ON0839	**235.7**	**0.20**	**TUA needed for spoil storage at USFS Road 316 crossing and to keep spoil out of the road where it parallels the ROW.**
ON0840	**235.7**	**0.38**	**TUA needed for spoil storage at Colorado Highway 160 crossing. This is a major highway that is approximately 90' from borrow ditch to borrow ditch. Stop TUA before fenceline on south side of Highway 160. USFS may realign USFS Road 316 to an area which approximates pipeline centerline next year.**
ON0744	**235.8**	**0.06**	**TUA needed for spoil due to side slope.**
ON0745	**235.8**	**0.08**	**TUA needed for spoil due to pipeline crossing and deeper trench.**
ON0746	236.0	0.23	TUA needed for spoil due to side slope.
TOTAL		49.13	

Appendix C-3

TransColorado Gas Transmission Project
Temporary Use Areas on Private and State Lands

Tracking #	MP	Acres	Comments
ON0011	0	1.15	TUA needed for pig launcher/receiver installation, tie-in to Questar, crossing of Dudley Gulch, and access to tie-in valves.
ON0707 **NOA**	0	1.15	TUA needed due to compressor station site.
ON0762 **NOA**	0	0.06	TUA needed due valve site, MLV-1. Northwest of Rio Blanco, Colorado. Access via Road #5. Road and/or gate into site-gravel.
NO0016	2.1	0.50	TUA needed for spoil storage at road bore.
ON0185 **NOA**	2.4	0.23	TUA needed for spoil storage at Piceance Creek crossing.
ON0217 **NOA**	2.5	0.11	TUA needed for Rocky Mountain Pipeline crossing.
ON0051	8.5	0.46	TUA needed for topsoil and spoil storage at the Willow Creek crossing.
ON0120	8.7	0.39	TUA needed for spoil storage and staging area for a dry wash that is crossed at an angle, the Willow Creek Road crossing, and the Rocky Mountain Pipeline crossing which are all in this location.
ON0121	8.7	0.14	TUA needed for a turnaround and for a staging area at base of a steep slope.
ON0124	8.75	0.11	TUA needed for spoil storage at Rocky Mountain Pipeline crossing.
ON0050	21.6	1.15	TUA needed south of an unnamed drainage due to steep side slope.
ON0126	23.1	0.09	TUA needed for spoil storage at a side slope and sharp P.I. near the Rocky Mountain Pipeline valve site.
ON0127	23.5	3.44	TUA needed for spoil storage at a side slope and steep slope.
ON0128	24.4	0.23	TUA needed for spoil storage at a steep side slope.
ON0208 **NOA**	25.0	0.34	TUA needed for spoil storage at creek crossing. Setback has changed from 10' to 50'.
ON0047	26.5	0.57	TUA needed due to a steep side slope on the east side of the ROW and the Rocky Mountain Pipeline immediately to the east.
ON0668	28.24	0.11	TUA needed for extra spoil storage due to existing Rocky Mountain Pipeline crossing.
ON0042	28.3	0.69	TUA needed for turnaround and to avoid Rocky Mountain Pipeline located 25' west of centerline.
ON0669	28.48	0.11	TUA needed for extra spoil storage due to existing Rocky Mountain Pipeline crossing.
ON0670	28.89	0.11	TUA needed for extra spoil storage due to existing Rocky Mountain Pipeline crossing.
ON0041	29.0	0.97	TUA needed on spoil side of ROW to avoid working over the Rocky Mountain Pipeline.

Tracking #	MP	Acres	Comments
ON0043	29.2	0.06	TUA needed due to Rocky Mountain Pipeline crossing.
ON0671	29.24	0.11	TUA needed for extra spoil storage due to existing Rocky Mountain Pipeline crossing.
ON0049	32.21	1.38	TUA needed due to a steep side hill.
ON0045	32.75	1.43	TUA needed for turnaround and sharp P.I.
ON0046	33.0	3.72	TUA needed for turnaround and staging area at the bottom of a steep hill, and TUA also needed for spoil and rock storage at steep slope.
ON0447	33.7	0.23	TUA needed for spoil storage at Rocky Mountain Pipeline crossing.
ON0533	33.8	0.34	Outside of 200' corridor. TUA needed for spoil storage at a Conn Creek Road and Conn Creek crossings. NOTE: Required only if proposed route change PRR049 is approved.
ON0534	34.15	0.29	Outside of 200' corridor. TUA needed for spoil storage at a Conn Creek Road and Conn Creek crossings. NOTE: Required only if proposed route change PRR049 is approved.
ON0448	**34.2**	**3.89**	**TUA needed since Rocky Mountain Pipeline is in the ROW on the west side. Cannot work on top of this pipeline.**
ON0153	34.85	0.11	TUA needed for spoil storage at a Rocky Mountain Pipeline crossing.
ON0152	35.0	0.23	TUA needed for main line valve installation and access from Conn Creek road.
ON0137	35.1	0.23	TUA needed for spoil storage at the Conn Creek Road crossing and Rocky Mountain Pipeline crossing.
ON0138	35.2	2.30	TUA needed for spoil storage at an extremely deep (approx. 30') incised draw at Conn Creek.
ON0140	35.85	0.57	TUA needed for wash crossing.
ON0154	36.05	1.18	TUA needed for wash crossing.
ON0144	37.1	0.57	TUA needed for wash crossing.
ON0143	37.25	**0.21**	TUA needed for wash crossing.
ON0286	**41.5**	**0.40**	**TUA needed for excess rock storage.**
ON0287	41.6	0.17	TUA needed for rock storage.
ON0288	41.7	**0.35**	TUA needed for turnaround and rock storage on a steep slope.
ON0172	**41.75**	**0.11**	**TUA needed for Rocky Mountain Pipeline crossing.**
ON0151	41.9	0.86	TUA needed for Roan Creek Road crossing. If crossing is bored, bore pits required each side of road, plus spoil pits for drill mud, plus a truck access road and turnaround area/staging area. If crossing is open cut, temporary by-pass required.
ON0451 **NOA**	42.1	0.17	TUA needed for spoil storage at Northwest Pipeline crossing.
ON0452 **NOA**	42.2	0.43	TUA needed for spoil storage at the Roan Creek crossing.
ON0453 **NOA**	42.25	2.22	TUA needed for staging area for a long drag section with concrete coating to be used for the Roan Creek crossing.

Tracking #	MP	Acres	Comments
ON0183	42.4	0.57	TUA needed for by-pass at South Dry Fork Road crossing. May need to gravel by-pass if muddy conditions exist.
ONO456	**43.5**	**0.57**	**TUA needed for spoil storage along rocky side slope just west of the Reservoir Canal.**
ON0457	43.5	**0.71**	TUA needed for spoil storage along rocky side slope just west of the Reservoir Canal.
ON0458	44.2	0.44	TUA needed for turnaround and staging area.
ON0460	44.2	0.17	TUA needed for spoil storage at bore under irrigation canal with fairly large flow.
ON0459	44.25	0.26	TUA needed for spoil storage at rocky side slope.
ON0461	44.6	0.11	TUA needed for turnaround. Large irrigation ditch to the north will cut off access. Also TUA needed for spoil storage for dry drainage crossing to the north.
ON0462	44.7	0.23	TUA needed for turnaround and spoil storage for dry drainage crossing to the north.
ON0463	44.8	0.17	TUA needed for spoil storage at Rocky Mountain Pipeline crossing.
ON0464	44.8	2.44	TUA needed because Rocky Mountain Pipeline is in the ROW in this area. Cannot safely work on top of the Rocky Mountain Pipeline.
ON0466	45.6	0.69	TUA needed for spoil storage at road and 2 pipeline crossings.
ON0504	**45.8**	**1.23**	**TUA needed for rock and spoil storage.**
ON0867	46.5	0.26	TUA needed for spoil storage at a road crossing
ON0868	46.6	0.11	TUA needed for spoil storage at a road crossing.
ON0871	46.65	0.66	TUA needed for spoil storage at steep slope.
ON0869	46.7	0.34	TUA needed to cross railroad and irrigation ditches.
ON0870	46.8	0.34	TUA needed to cross railroad and private road.
ON0291	47.3	0.48	TUA needed for creek crossing. 50' setbacks required between each TUA and the creek.
ON0292	47.4	0.17	TUA needed for turnaround location north of the Colorado River.
ON0505 **NOA**	47.6	3.0	TUA needed for the Colorado River crossing. The deep river channel is on the south bank, so the spoil will have to be stored on the bank, leaving the deep channel open. 110' setback from the west TUA to the river. Less than 50' setback from east TUA to the river. Variance is required.
ON0293	48.7	0.78	TUA needed for road bore of I-70, approximately 500' bore.
ON0289	48.75	0.57	TUA needed for canal, road, and gas line crossings.
ON0510	48.8	4.42	TUA needed since the Rocky Mountain Pipeline is in the working side of the ROW. Cannot work on top of the existing pipeline.
ON1014	**49.0**	**2.40**	**TUA needed for topsoil storage.**
ON0467	49.6	0.09	TUA needed for spoil storage at fairly deep and wide irrigation drainage (dry) in flat pasture land.
ON0468 **NOA**	50.2	0.23	TUA needed for bore of a large, raised irrigation canal.
ON0469	50.45	0.52	TUA needed for a turnaround and staging area.
ON0470	50.6	0.09	TUA needed for spoil storage at gas line crossing.

Tracking #	MP	Acres	Comments
ON0471	50.9	0.33	TUA needed for spoil storage at small incised draw crossing.
ON0472	50.95	0.12	TUA needed for spoil storage at Rocky Mountain Pipeline crossing.
ON0473 **NOA**	50.95	0.13	TUA needed for spoil storage due to rough topography and deeper cover due to erosion potential.
ON0474	51.1	0.69	TUA needed for spoil storage at steep slope with lots of rock. Working near Rocky Mountain Pipeline.
ONO475	51.9	0.45	TUA needed for road bore and crossing of gas line.
ON0674	51.95	3.79	TUA needed due to close proximity to existing Rocky Mountain Pipeline. Cannot work on top of shallow pipeline buried in rocky soil.
ON0478	53.19	0.23	TUA needed for turnaround at flat area along road.
ON0479	53.4	0.17	TUA needed for spoil storage for dry drainage crossing.
ON0675	53.5	1.17	TUA needed due to close proximity to existing Rocky Mountain Pipeline. Cannot work on top of shallow pipeline buried in this rocky area.
ON0513	55.1	0.17	TUA needed for spoil storage at wash crossing.
ON0514	55.15	0.34	TUA needed for spoil storage at dry wash crossing.
ON0515	55.25	0.34	TUA needed for spoil storage at Rocky Mountain Pipeline crossing.
ON0518	55.9	0.23	TUA needed for spoil storage at a dry wash crossing.
ON0522	56.6	0.34	TUA needed for spoil storage at Rocky Mountain Pipeline crossings.
ON0872 **NOA**	57.2	0.23	TUA needed for rock and spoil storage at a wash crossing.
ON0523	57.25	0.60	TUA needed for spoil storage and staging for the crossing of Debeque Cut-off Road. TUA will be needed if the road is bored or if the road is open cut (for a by-pass).
ON0524	57.3	0.57	TUA needed for spoil storage at crossing of the Rocky Mountain Pipeline and a dirt road.
ON1009	57.6	1.00	Part of realignment PRR071R. TUA is needed for pipe storage area for lay through DeBeque Cutoff.
ON1010	57.7	0.44	Part of realignment PRR071R. TUA is needed for pipe staging area for lay through DeBeque Cutoff.
ON1011	57.75	0.34	Part of realignment PRR071R. TUA is needed because it is the only work space available in this area for Highway 65 road bore (north side of Highway 65).
ON1012	57.8	0.13	Part of realignment PRR071R. TUA is needed for Highway 65 road bore. Must keep private driveway to landowner's business open.
ON0862	58.7	8.83	TUA needed for a staging area, a creek crossing, and due to construction in a road ditch.
ON1017 **NOA**	58.9	6.39	Part of PRR068. TUA is needed for pipe staging and spread break.
ON0115	59.66	0.06	TUA needed for spoil storage and staging area at stream crossing. Small, flowing stream is tributary to Plateau Creek.

Tracking #	MP	Acres	Comments
ON0116	59.67	0.06	TUA needed for spoil storage and staging area at stream crossing. Small, flowing stream is tributary to Plateau Creek.
ON0097	60.09	0.14	TUA needed to store spoil during creek crossing.
ON0102	60.1	2.87	TUA needed for waterbar installation. The Enron ROW is on the working side. It was not cleaned up or water barred. It will be necessary to extend TransColorado waterbars across Enron ROW to drain properly.
ON0098	60.2	0.69	TUA needed since side hill cut in bank not put back on Enron ROW.
ON0099	60.4	0.80	TUA needed due to steep side slope and creek crossing.
ON0100	60.5	1.03	TUA needed due to small incised stream crossing, then steep slope with cut from old ROW.
ON0101	60.5	0.77	TUA needed due to side hill cut with bank from the old ROW. Also, there is an overbend at C815.
ON0023	61.35	0.46	TUA needed for spoil storage at a deeply incised ditch crossing.
ON0103	61.3	0.11	TUA needed to store excess spoil from crossing of dry wash.
ON0055	61.66	0.04	TUA needed for spoil storage at a small gully crossing with steep banks.
ON0125	**61.5**	**0.07**	**TUA needed for spoil storage next to wash crossing.**
ON0024 **NOA**	61.51	0.07	TUA needed for spoil storage at the top of a steep slope.
ON0104	62.0	**0.58**	TUA needed for turnouts for passing on the ROW.
ON0903	67.9	1.38	TUA needed for pipe staging and for equipment staging in the Grand Mesa area.
ON0874	68.1	0.23	TUA needed for turnaround and staging area.
ON0902	69.8	0.57	TUA needed for pipe staging and for staging in the Grand Mesa area.
ON0072	70.85	0.07	TUA needed for staging area associated with minor creek crossing.
ON0073	70.97	0.11	TUA needed for spoil storage associated with incised stream crossing.
ON0059	71.18	1.38	TUA needed for a staging and parking area that is adjacent to a road which is on the ROW.
ON1008	73.2	0.14	TUA is needed for spoil storage space due to overbend cut at slope to the north of Watson Creek.
ON1007	73.4	0.11	TUA is needed due to sideslope cut-and-fill. West facing slope is approximately 700 feet north of Watson Creek.
ON0875	73.5	0.29	TUA needed for supplemental staging area, parking, and material storage for Grand Mesa Construction.
ON0058	73.56	0.29	TUA needed for spoil storage and work space near very steep slope.
ON0891	74.1	1.72	TUA needed for a staging area.
ON0052 **NOA**	82.2	0.57	TUA needed for storage of basalt boulders.
ON1016	82.2	**0.24**	TUA is needed because this area may require reverse lay due to dry drain encroachment on working side.

Tracking #	MP	Acres	Comments
ON1015	**82.5**	**0.50**	**Part of PRR003. TUA is needed because dry drain on working side of ROW may require reverse lay.**
ON0893	83.4	2.07	TUA needed for spoil storage at the Whitewater Creek crossing.
ON0112	86.18	0.11	TUA needed for road bore.
ON0111	86.28	0.09	TUA needed for spoil storage at an irrigation ditch crossing.
ON0110	86.43	0.11	TUA needed for spoil storage at incised draw crossing.
ON0109	**86.49**	**0.14**	**TUA needed for spoil storage at a deep draw crossing.**
ON0180	**87.8**	**0.86**	**TUA needed for spoil storage at a side slope.**
ON0858	88.1	0.57	TUA needed for spoil storage due to side slope.
ON0842	88.7	0.63	TUA needed for spoil storage at steep slopes with some side slope dropping into a dry drainage.
ON0843	89.1	0.52	TUA needed for spoil storage at Kannah Creek Road crossing.
ON0878	89.43	0.26	TUA needed for spoil storage at creek crossing with high bluff on south side. Maintain 50' buffers from creek/wetland to TUA.
ON0879	89.6	0.88	TUA needed for spoil storage at creek crossing with high bluff on south side. Maintain 50' buffers from creek/wetland to TUA.
ON0653	95.1	0.34	TUA needed for spoil storage due to dry wash crossing. Dry wash is 10' to 15' deep. The north side is close to road.
ON0654	**95.1**	**0.06**	**TUA needed for spoil storage due to wash crossing. Wash is 6' deep and 10' wide.**
ON0655	**95.18**	**0.06**	**TUA needed for staging area due to wash to the south. Flat area available between two washes.**
ON0880	**107.1**	**0.52**	**TUA needed for spoil storage and parking space at the U.S. Highway 50 road bore.**
ON0314	109.0	0.06	TUA needed for spoil storage for overbend at the top of a 45% slope.
ON0315	109.0	0.11	TUA needed for spoil storage for 45% slope covered with large, loose boulders.
ON0316	109.1	0.06	TUA needed for spoil storage for a 35% slope with 4-5% side slope, work to spoil side. Loose boulders.
ON0317	109.17	0.11	TUA needed spoil storage out of dry wash on spoil side.
ON0113	109.3	0.26	TUA needed for overbend at the top of high bank of the Gunnison River.
ON0877 **NOA**	109.5	4.18	TUA needed for crossing Gunnison River and Roubideau Creek.
ON0222 **NOA**	109.6	0.06	Outside of existing 200' corridor. TUA needed for spoil storage at bore pit. NOTE: Required only if proposed route change PRR020 is approved.
ON0318	110.2	0.17	TUA needed for spoil storage for side hill cut and dry wash.
ON0319	110.3	0.64	TUA needed for spoil storage for side hill cut. Broken ground. Only 10' available on spoil side because of fence and road.
ON0320	111.5	0.17	TUA needed for spoil storage for side hill cut.
ON0734	111.71	0.16	TUA is needed due to steep rocky slope for spoil storage.

Tracking #	MP	Acres	Comments
ON0735	111.8	0.18	TUA is needed due to steep slope for spoil storage.
ON0738	111.81	0.37	TUA is needed due to open cut of stream bank, but can easily be flumed except at flood flows.
ON0736	111.9	0.40	TUA is needed due to steep slope for spoil storage. South side of Cottonwood Creek.
ON0737	112.0	0.23	TUA is needed due to steep slope for spoil storage. Slope down to flood plain on south side of Cottonwood Creek.
ON0567	113.5	0.14	TUA needed for spoil storage due to overbend.
ON0568	113.43	0.50	TUA needed for spoil storage due to cut through rock ledges. Channel of dry wash below will have spoil fall into it.
ON0569	113.41	0.09	TUA needed for turnaround.
ON0566	113.7	0.14	TUA needed for spoil storage due to cut through rock ledge.
ON0624	114.6	0.26	TUA needed due to overbend for spoil storage on slope. South slope of Roubideau Creek.
ON0445	119.62	0.05	TUA needed for spoil storage for cut in bank of dry wash.
ON0446	119.6	0.32	TUA needed for spoil storage at cut through exposed 5-10' vertical bedrock ledges. 80% slope. Overbend at top.
ON0444	119.68	0.05	TUA needed for spoil storage for cut in bank of 8' high dry wash.
ON0443	119.7	0.03	TUA needed for spoil storage for cut in bank of 8' high dry wash.
ON0442	119.8	0.09	TUA needed for spoil storage for a 5% side hill, road cut, and rock ledge.
ON0426	120.4	0.03	TUA needed for spoil storage at a cut in a 10' high rock ledge.
ON0357	120.5	0.06	TUA needed for spoil storage at a bedrock ledge.
ON0427	120.5	0.06	TUA needed for spoil storage at a dry wash with 6-8' banks.
ON0428	120.5	0.06	TUA needed for spoil storage at a 15' high rock ledge, bedrock exposed for 100'.
ON0440	120.51	0.11	TUA needed for spoil storage at cut through 15' bedrock ledge. Surface boulders to 5'x15' high.
ON0429	120.56	0.09	TUA needed for spoil storage for a side hill cut.
ON0425	120.6	0.09	TUA needed for spoil storage at rocky slope to dry wash. Loose surface boulders.
ON0420	120.8	0.11	TUA needed for spoil storage at a cut in the banks of wash. Banks 6-8' high.
ON0421	121.15	0.23	TUA needed for spoil storage at a 45 degree side bend at PI at end of relocation.
ON0408	121.22	0.06	TUA needed for spoil storage since a large pile of large rocks is stockpiled on the ROW.
ON0409	121.34	0.06	TUA needed for spoil storage at a cut through the banks at a dry wash.
ON0407	121.5	0.17	TUA needed for spoil storage at 45 degree PI on ridge top and bedrock.
ON0406	121.6	0.26	TUA needed for spoil storage at an exposed bedrock ledge.

Tracking #	MP	Acres	Comments
ON0405	121.61	0.29	TUA needed for spoil storage at exposed bedrock ledges with large boulders.
ON0404	121.62	0.20	TUA needed for spoil storage at a bedrock ledge with loose boulders on surface.
ON0200	136.4	0.26	TUA needed for Rocky Mountain Pipeline crossing.
ON0528	136.9	1.15	TUA needed since an irrigation canal runs down the ditch line in this area. It will need to be relocated.
ON0173	141.2	0.29	TUA needed for spoil storage at crossings of the Rocky Mountain Pipeline and a road.
ON0192	**141.8**	**0.18**	**TUA needed for spoil storage at crossings of the Rocky Mountain Pipeline and a road.**
ON0129	141.8	0.09	TUA needed for turnaround prior to working on the east side of the Rocky Mountain Pipeline.
ON0256	149.5	0.23	TUA needed for hydrostatic test area plus turnaround.
ON0275	**154.7**	**0.69**	**TUA needed for steep slope construction.**
ON0276	155.35	0.34	TUA needed for Rocky Mountain Pipeline crossing.
ON0277	155.4	1.00	TUA needed for spoil storage at a side hill cut and steep ROW.
ON0680	155.4	0.19	TUA needed for spoil storage due to canal crossing and possible bore pit.
ON0885	155.7	1.27	TUA needed for spoil storage at the San Miguel river crossing.
ON0685	156.85	0.23	TUA needed for spoil storage due to drainage crossing.
ON0686	156.9	0.11	TUA needed for spoil storage due to drainage crossing.
ON0687	157.75	0.28	TUA needed due to road crossing and truck turn.
ON0688	158.3	0.11	TUA needed due private driveway crossing.
ON0689	159.8	1.63	TUA needed due steep drop into canyon for a truck turnaround. Also, TUA needed for staging area for creek and wetland at Maverick Draw.
ON0701	160.0	1.03	TUA needed for rock storage due to excessive rock in area. Rock face is a vertical bluff for a short distance.
ON0702	160.4	0.74	TUA needed due to false fill from cut made by Rocky Mountain Pipeline. No TUA is available on working side due to wetland area within 50' of standard ROW.
ON0693	160.5	0.20	TUA needed for spoil storage at irrigation ditch and canal crossing.
ON0694	160.6	0.12	TUA needed spoil storage from Rocky Mountain Pipeline crossing and wetland crossing and to avoid stockpond.
ON0295	160.7	0.23	TUA needed for spoil storage for road crossing.
ON0696	160.65	1.17	TUA needed for spoil storage coming out of a wetland area with reduced ROW. TUA for road crossing only.
ON0529	161.6	2.07	TUA needed to facilitate safe pipeline installation. TUA is setback over 50' from wetlands or streams.
ON0297	161.9	0.29	TUA needed for working space since working on the wrong side of the Rocky Mountain Pipeline.
ON0298	161.9	0.34	TUA needed for turnaround.
ON0299	162.0	0.26	TUA needed for working space next to the Rocky Mountain Pipeline.
ON0300	162.8	0.14	TUA needed for spoil storage at road crossing.

Tracking #	MP	Acres	Comments
ON0301	163.4	0.06	TUA needed for staging area prior to leaving main road.
ON0555	164.2	0.06	TUA needed to keep access road open for property owners.
ON0302	164.7	0.57	TUA needed for storage of excess rock.
ON0303	165.0	1.61	TUA needed for dry drainage that runs along the ditch line.
ON0556	165.4	0.06	TUA needed to keep access road open for property owners.
ON0361	165.9	0.09	TUA needed for Rocky Mountain Pipeline Crossing.
ON0360	166.0	**2.60**	TUA needed for spoil and rock storage at a rocky side slope.
ON0359	167.0	0.11	TUA needed for spoil storage at dry drainage with steep banks. Hold 10' buffer from streambank.
ON0358	167.1	0.82	TUA needed for rock storage for large rock expected to be excavated from the ditch.
ON0557	167.3	0.69	TUA needed for rock storage of heavy surface rock on 30% side slope.
ON0554	167.5	0.96	TUA needed for large rock storage from grade and ditch so working space can be maintained.
ON0548	168.0	4.56	TUA needed for staging area at three road crossings: County Road U29, County Road W35, and a 2 track road. Also needed to store the extensive surface and subsurface rock in this area.
ON0363	168.7	0.57	TUA needed for rock storage for grade and ditch on steep slope.
ON0550	174.9	0.11	TUA needed for spoil storage near dry drainage (approximately 30' wide) with 8' to 10' vertical banks.
ON0381	175.5	0.26	TUA needed for spoil storage at road crossing.
ON0617	176.2	0.17	TUA needed for wetland and creek crossing.
ON0630	177.4	0.17	Associated with proposed realignment PRR030. TUA needed for spoil storage at road crossing.
ON1036	178.0	0.23	TUA is needed for drainage and associated wetland crossing. 50' buffers required.
ON0559	178.5	0.11	TUA needed due to road crossing (Co. Rd. 39).
ON0037	178.6	0.40	TUA needed for wetland topsoil storage, and spoil storage. Access from road to the north at PI N720.
ON0038	179.0	0.11	TUA needed for spoil storage at a dry drainage.
ON0086	179.0	0.09	TUA needed for road crossing. Road will need to be moved during grade and road fill material will need to be stored.
ON0085	180.0	0.23	TUA needed for spoil storage due to a side slope.
ON0087 **NOA**	180.0	0.28	TUA needed due to wetland crossings, incised drains, a steep slope, and an overbend.
ON0084	181.5	0.92	TUA needed due to creek crossing and close proximity of a flowing creek and wetland along north side of the ROW. TUA also needed for spoil storage for overbends.
ON0091	181.9	0.11	Outside of existing 200' corridor. TUA needed for spoil storage if proposed route change PRR039 is approved.
ON0092	182.0	**0.18**	Outside of existing 200' corridor. TUA needed for spoil storage due to overbend. Required if proposed route change PRR039 is approved.

Tracking #	MP	Acres	Comments
ON0093	182.1	0.06	Outside of existing 200' corridor. TUA needed for spoil storage due to sharp PI. Required if proposed route change PRR039 is approved.
ON0610	183.0	0.19	TUA needed for spoil storage for a road crossing.
ON0611	183.5	0.04	TUA needed for spoil storage for dry drainage crossing.
ON0612	183.6	0.03	TUA needed for spoil storage due to irrigation ditch.
ON0613	184.0	0.06	TUA needed for spoil storage at two small creek crossings with a possible wetland in between.
ON0544	184.2	4.24	TUA needed for spoil storage at a side slope.
ON0545	184.7	0.34	TUA needed for spoil storage for the road crossing and an equipment off-load area.
ON0614	185.9	0.75	TUA needed for spoil storage at a steep, side slope.
ON0067	185.1	0.04	TUA needed due to a steep slope at the road crossing.
ON0064 **NOA**	185.3	0.11	TUA needed on the working side due to a power line on the spoil side. Access via power line road.
ON0062	185.4	0.23	TUA needed on the working side of the ROW due to a power line on the spoil side. Access via power line road.
ON0066	185.7	0.57	TUA needed due to steep side slope.
ON0063	186.0	0.06	TUA needed for spoil storage at the dry drainage crossing and possible wetland. 50' setback from wetland.
ON0061	186.1	0.06	TUA needed for spoil storage at dry drainage crossing and possible wetland. 50' setback from wetland.
ON0615	186.1	0.37	TUA needed for spoil storage for side hill, stream crossing, and possible wetland crossing.
ON0616	186.6	0.86	TUA needed for spoil storage at a steep, sidehill cut.
ON0094	187.5	2.51	TUA needed for spoil storage on hillside with slope of 40% - 50%.
ON0228	187.6	0.26	TUA needed for turnaround area at the top of a steep slope.
ON0229	187.9	0.26	TUA needed for turnaround area at the top of a steep slope.
ON0095	188.0	6.19	TUA needed for spoil storage on hillside with slope of 30% - 47%.
ON0075	188.5	0.34	TUA needed to avoid large yellow pine and for county road crossing.
ON0226	188.6	0.29	TUA needed for spoil storage of side hill cut.
ON0225	188.7	0.09	Within existing 200' corridor. Change of working side and TUA needed due to proximity of road to centerline. The working side shift would prevent road blockage. TUA is needed for the road crossing itself.
ON0227	188.8	0.34	TUA needed for spoil storage of side hill cut.
ON0210	188.9	0.00	Change working side due to encroachment of side hill drop off on normal working side of ROW.
ON0206	189.0	0.46	TUA needed for staging area and turnaround at the top of a 58% slope.
ON0205	189.1	0.57	TUA needed for spoil storage at a steep slope.
ON0203	189.2	0.17	TUA needed for staging area at wetland.
ON0204	189.3	0.11	TUA needed for staging area at wetland.
ON0218	189.4	0.49	TUA needed at steep slope. This area will require 10 trench breakers per Record of Decision.

Tracking #	MP	Acres	Comments
ON0209	189.5	0.38	TUA needed for spoil storage at creek crossing.
ON0202	189.7	0.31	TUA needed for Morrison Creek crossing.
ON0507	189.9	0.23	TUA needed for spoil storage at a side slope.
ON0509	189.95	0.55	TUA needed for spoil storage at a steep side slope and road crossing.
ON0508	189.96	0.55	TUA needed for spoil storage at a 40% side slope and road crossing.
ON0338	190.1	0.46	TUA needed for side hill cut.
ON0339	190.3	0.11	TUA needed for spoil storage at a dry drainage.
ON0340	190.4	0.06	TUA needed for spoil storage at steep slope.
ON0341	190.7	0.72	TUA needed for spoil storage at a steep, compound side slope.
ON0230	190.75	0.20	Working side shift and TUA needed due to encroachment of downhill side slope on normal working side of ROW.
ON0342	191.1	0.20	TUA needed for spoil storage at steep, compound side slope.
ON0541	191.2	0.45	TUA needed for spoil storage at steep slope that will need to be graded.
ON0549	191.25	0.07	TUA needed for spoil storage at Disappointment Creek. Very steep slopes on both sides of creek. Riparian wetland areas limit ability to stage pipe or equipment for this crossing.
ON0570	191.3	1.58	TUA needed for spoil storage at an extremely steep slope.
ON0215	191.5	0.82	TUA needed for spoil storage at a steep slope.
ON0336	191.7	0.11	TUA needed for staging area at a wetland and drainage.
ON0337	191.8	0.15	TUA needed for staging area at wetland. Wetland runs parallel with working side of ROW. No TUA possible there.
ON0343	191.9	0.30	TUA needed for spoil storage at a 25% side hill cut.
ON0344	192.0	0.32	TUA needed for staging area and road crossing above creek.
ONO216	192.1	0.47	TUA needed for steep side slope.
ON0081	192.35	0.27	TUA needed for spoil storage for a side slope cut.
ON0080	192.5	0.07	TUA needed for spoil storage for a side slope cut.
ON0079	192.55	0.11	TUA needed for spoil storage for a side slope cut, power line access road crossing, and an overbend.
ON0074	192.6	0.06	TUA needed for spoil storage due to necessity of excavating grade for overbend.
ON0553	192.65	0.06	TUA needed for spoil storage near January 14, 1998r overbend.
ON0078	192.7	0.20	TUA needed for spoil storage for a side slope cut.
ON0076	193.05	0.68	TUA needed for staging areas for a large wetland crossing.
ON0224	193.1	0.20	TUA needed for spoil storage since centerline crosses a wetland. TUA is not in the wetland and is over 50' from wetland.
ON0077	193.2	0.36	TUA needed for spoil storage for a side hill cut.
ON0351	193.5	0.64	TUA needed for staging and turn around areas.
ON0547	193.7	0.26	TUA needed for staging area and spoil storage for drag section for constrained ROW to the south.

Tracking #	MP	Acres	Comments
ON0540	193.9	0.59	TUA needed since a dry drainage runs down the ROW east of center line. TUA necessary to keep drain open on the east side of the ROW during construction.
ON0352	194.0	0.40	TUA needed for spoil storage at a steep slope and steep compound slope.
ON0537	194.1	2.10	TUA needed for spoil storage at steep side hill slope. Associated with proposed realignment PRR035.
ON0350	194.4	0.34	TUA needed for Dolores Road crossing.
ON0349	194.6	0.11	TUA needed for staging area for wetland crossing. 50' setbacks from wetland to TUA.
ON0348	195.1	0.31	TUA needed for dry wetland crossing. There are 25% side slopes on the south side. 50' setbacks from wetland to TUA on the west side of the ROW. Due to topography, may not be able to maintain 50' setback on the south east side.
ON0419	196.2	0.49	TUA needed for staging area.
ON0894	196.2	0.52	TUA needed for a small stream crossing to the north and south of the TUA.
ON0851 **NOA**	197.9	0.52	TUA is needed due to a very steep side slope. Also, TUA is needed for a staging area due to a wetland at the bottom of steep slope. Wetland and flowing drainage exist approximately 45' to 50' to the north.
ON0852	198.0	0.11	TUA is needed for a staging area due to wetland and flowing drainage crossing(s).
ON0435	198.3	0.23	TUA needed due to slope.
ON0433	198.4	0.17	TUA needed due to road crossing for staging area.
ON0434	198.4	0.11	TUA needed starting 30' from wetland fringe on wet drain, back from high bank due to creek and road crossings.
ON0432	198.7	0.42	TUA needed for spoil storage upslope of wetland due to wet slope.
ON0430	198.9	0.00	Shift working side to avoid fence line. No TUA required.
ON0663	198.9	0.29	TUA needed for staging area due to a side slope. Staging area off main road.
ON0664	199.1	0.17	TUA needed for staging area due to wetland crossing and wet drainage.
ON0665	199.2	0.44	TUA needed for spoil storage due to steep side slope which will need to be graded. Drainage at bottom of working side.
ON0690	199.5	0.09	TUA needed for landowner access road crossing, to keep road clear.
ON0697	200.3	0.40	TUA needed for spoil storage at rocky, steep slope. Hold TUA 50' back from possible wetland.
ON0679	200.5	2.23	TUA needed for spoil storage at a side slope.
ON0691	200.9	0.51	TUA needed for spoil storage at the Dolores/Norwood County Road #31 crossing. Associated with proposed realignment PRR040.
ON0704	201.8	0.23	TUA needed for staging area for crossing a large wetland complex to the south.
ON0699	202.2	0.34	TUA needed for spoil storage at a large, deep pond adjacent to center line of the working side. Work side might need to be reversed.

Tracking #	MP	Acres	Comments
ON0703	202.4	0.22	TUA needed for spoil storage at creek crossing with associated wetland that parallels the spoil side on the north bank and then parallels the work side on the south bank. Maintain 50' setbacks between TUA and creek.
ON0678	202.5	**0.29**	TUA needed for spoil storage at a side hill slope.
ON0648	205.5	0.11	TUA needed for spoil storage at dry drainage with incised banks.
ON1035	223.7	0.23	TUA is needed for Turkey Ditch crossing and small pond crossing. Delete this request if PRR037 is approved.
ON0489	223.9	0.23	TUA needed for staging are for crossing Turkey Creek.
ON0496	227.5	0.85	TUA needed for spoil storage at steep slope with excess rock.
ON0497	227.6	2.10	TUA needed for Jackson Gulch Canal crossing and West-Mancos River crossing.
ON0733	227.7	0.26	TUA is needed due to slope to the west of Mancos River for a turnaround and staging area before dropping down slope.
ON0732	228.1	0.12	TUA is needed due to side slope cut for extra spoil storage.
ON0731	228.2	0.11	TUA is needed for turnaround and staging area due to slope which drops into flowing creek.
ON0743	229.2	0.47	TUA is needed due to stream crossing.
ON0742	229.3	0.34	TUA is needed for turnaround and staging for slope which drops into flowing creek.
ON0761	229.3	0.11	TUA is needed to storage spoil from side slope cut.
ON0838 **NOA**	233.2	0.88	TUA needed for the East Mancos River crossing.
ON0752	235.9	0.10	TUA is needed due to BLM access road crossing and start of slope.
ON0746	236.0	0.23	TUA is needed due to side slope. Need space to store spoil from cut.
ON0747	236.1	1.32	TUA is needed due to side slope for topsoil storage from cut.
ON0748	236.5	0.69	TUA is needed to store spoil and topsoil from sidehill cut.
ON0749	236.7	0.23	TUA is needed for a turnaround as the last turnaround area is approximately one mile away.
ON0750	236.7	0.23	TUA is needed due to dry drain with 15' banks. Will need grading for mainline ROW. Shell Pipeline is approximately 25' from centerline on spoil side.
ON0751	236.8	0.80	TUA is needed due to steep side slope for spoil storage from cut.
ON0753	236.95	0.34	TUA is needed for spoil and topsoil storage due to side hill cut.
ON0754	237.4	0.37	TUA is needed for spoil and topsoil storage due to cut in side slope.
ON0755	237.5	0.23	TUA is needed for turnaround on level ground.
ON0756	237.5	0.17	TUA is needed due to steep bank on dry drainage.
ON0757	237.6	0.52	TUA is needed for spoil and topsoil storage for side hill cut.
ON0758	237.7	0.29	TUA is needed to place spoil from side slope cut.

Tracking #	MP	Acres	Comments
ON0759	237.9	0.72	TUA is needed for spoil and topsoil storage from side hill cut.
ON0768	238.6	0.10	TUA needed due to County Road 105 crossing (road bore). Pasture/hayfield west of road.
ON0769	238.7	0.18	TUA needed due to County Road 105 crossing (road bore). Pasture/hayfield east of road.
ON0804	238.8	0.32	TUA needed due to Cherry Creek crossing open cut. Little room for vegetative buffer on south side due to steep slope.
ON0770	238.9	0.72	TUA needed due to side slope cut-and-fill and for boulder storage.
ON0771	239.3	0.29	TUA needed due to side slope cut-and-fill.
ON0772	239.6	0.52	TUA needed due to open cut at the Cherry Creek crossing. Very little room for buffer and staging area setbacks due to steep V-shaped valley. Access via farm road from County Road 105.
ON0887	240.0	4.05	TUA needed due to steep slope (60%) and excessive amounts of rock and timber.
ON0888	241.0	0.34	TUA needed for staging area and turnaround.
ON0773	244.0	0.97	TUA needed for spoil and rock storage for steep slope. South facing slope overlooking Alkali Gulch.
ON0827	246.2	0.23	TUA needed for the La Plata County Road 117 crossing and for a staging area for the approximate 7 miles between major access roads.
ON0828	246.9	0.07	TUA north of road needed for the La Plata County Road 116 crossing. Maintain 50' buffer between TUA and wet drain to the north.
ON0829	246.9	0.11	TUA south of road needed for the La Plata County Road 116 crossing.
ON0774	247.1	0.06	TUA needed for extra spoil storage due to foreign pipeline crossing.
ON0775	247.2	0.06	TUA needed for extra spoil storage due to small field drain at edge of cropland
ON0776	247.4	0.06	TUA needed for extra spoil storage due to foreign pipeline crossing.
ON0841	250.75	0.06	TUA needed for the El Paso Natural Gas pipeline crossing. Spilt TUA at centerline of gas line with 50' on either side.
ON0777 **NOA**	252.5	0.32	TUA needed for spoil storage and staging area due to steep slope on river crossing. Narrow riparian zone in rangeland. Access via County Road 100. North slope does not allow setback of staging area and buffer is only 20'.
ON0779	252.8	0.06	TUA needed for spoil storage at toe of steep slope. Rangeland area.
ON0778	252.85	0.06	TUA needed for spoil storage due to overbend cut. Slope near edge of cornfield overlooking La Plata Valley.
ON0780	253.1	0.23	TUA needed for spoil storage due to County Road 100. Irrigated farm land area. Irrigation ditch on north side of county road.
ON0785	253.6	0.11	TUA needed for spoil storage at dry wash crossing. Dry wash in rangeland.

Tracking #	MP	Acres	Comments
ON1030	253.6	0.09	Part of PRR058R. TUA is needed for Shell Pipeline Crossing and private driveway crossing.
ON1031	253.7	0.40	Part of PRR058R. TUA is needed for draw crossing and dry pond bed.
ON1032	253.75	0.17	Part of PRR058R. TUA is needed to cross dry wash.
ON0781	253.8	0.11	TUA needed for spoil storage due dry drainage crossing. Dry drainage in cornfield.
ON1033	254.4	0.03	Part of PRR058R. TUA is needed for LaPlata County Road 104 crossing.
ON1034	254.5	0.11	Part of PRR058R. TUA is needed to store extra spoil and install PI's to cross under Shell Pipeline.
ON0786	255.4	0.09	TUA needed for spoil storage at foreign pipeline crossing. Level rangeland.
ON0787	255.6	0.57	TUA needed due to open cut at river crossing. Staging area setbacks of 50' not possible due to steep slope of v-shaped valley.
ON0788	257.0	0.06	TUA needed due for spoil storage to overbend cut. Rangeland, slope overlooking La Plata River Valley.
ON0760	257.25	0.23	TUA is needed due to turnaround and staging area for La Plata River crossing.
ON1028	258.2	0.09	Part of PRR078. TUA is needed to make tie-in of river section.
ON1029	258.5	0.40	Part of PRR078. TUA is needed for a staging area for drag section to cross La Plata River and associated wetland. Shell Pipeline runs parallel 25' to the east of centerline.
ON1018	258.6	0.04	Part of PRR078. TUA is needed for spoil storage to cross dry drain. Shell Pipeline is 25' to the east on spoil side.
ON1019	259.6	0.23	Part of PRR078. TUA is needed for road crossing and drainage ditch. Shell Pipeline is 25' to the east on spoil side.
ON1020	259.7	0.09	Part of PRR078. TUA is needed for Shell Pipeline crossing.
ON1021	259.9	0.17	Part of PRR078. TUA is needed to prevent working over Shell Pipeline.
ON1022	259.9	0.71	Part of PRR078. TUA is needed for Shell Pipeline Crossing.
ON0789	**259.0**	**1.43**	**TUA needed for topsoil storage.**
ON0790	259.9	0.14	TUA needed due to the La Plata River crossing for spoil storage and staging area. Open land, level relief into La Plata River.
ON0791	260.1	0.29	TUA needed due to the La Plata River crossing for spoil storage and staging area. 50' setback from the river. Area is open land.
ON0068	261.0	0.29	TUA needed due to dry drainage crossing and steep slope into drainage.
ON0065	262.0	0.23	TUA needed for crossing of 40'-wide, 10'-deep irrigation ditch.
ON1027	263.1	0.90	Part of PRR065. TUA is needed for irrigation canal and County Road 1115 crossings.

Tracking #	MP	Acres	Comments
ON0792	263.7	0.34	TUA needed due to open cut at the La Plata River crossing. 10' buffer due to topographic constraints from Hwy. 170 crossing in conjunction with river crossing.
ON0793	263.8	0.14	TUA needed for spoil storage due to New Mexico Hwy. 170 crossing. East side of Hwy 170 is rangeland.
ON0830	**264.5**	**0.35**	**TUA needed for arroyo/road crossing.**
ON0799	270.0	0.14	TUA needed due to dirt road crossing (Montoya Sheep and Cattle Company road) in rangeland.
ON0800	270.3	0.09	TUA needed for spoil storage due to Shell Pipeline crossing in rangeland.
ON0782	270.7	0.40	TUA needed for spoil storage due to road crossing and foreign pipeline crossing. Dirt road crossing in rangeland.
ON0801	271.0	0.52	TUA needed due to side slope cut-and-fill in rangeland.
ON0802	271.3	0.09	TUA needed due to dirt road and foreign pipeline crossing.
ON0783	271.5	0.30	TUA needed for spoil storage due to road crossing and El Paso pipeline crossing. Dirt road crossing in rangeland.
ON0803	271.9	0.11	TUA needed for spoil storage due to dry wash crossing (30' wide by 15' deep).
ON0784	272.0	0.40	TUA needed for spoil storage from dry wash crossing. Also TUA needed due to pipeline terminus tie-in and valve site.

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